

SKILL BUILDING MATH GAMES & ACTIVITIES

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The Common Core State Standards lists eight “Standards for Mathematical Practice, “ as follows:

- 1) Make sense of problems and persevere in solving them.
- 2) Reason abstractly and quantitatively.
- 3) Construct viable arguments and critique the reasoning of others.
- 4) Model with Mathematics.
- 5) Use appropriate tools strategically.
- 6) Attend to precision.
- 7) Look for and make use of structure.
- 8) Look for and express regularity in repeated reasoning.

The numbers listed with the games that follow refer to these CCSS mathematical practices.

NOTE: *When played at the beginning of a math period, many of the games and activities that follow serve three important purposes: they get students’ attention, they focus students on math, and the game/activity puts students in a positive math frame of mind prior to starting the math lesson.*

PRIMARY SKILL-BUILDING GAMES & ACTIVITIES

Addition Bingo – 5, 6 (STRAND: Number Sense-Addition):

Pass out 4x4 grids to students (16 squares total. Or, have students fold a piece of paper twice the hot dog way and twice the hamburger way.) Instruct students to put down any numbers from 0 to 20 in each of the squares. The same number cannot be used more than once. The teacher calls out addition problems from flash cards but does not say the answer. If the student has the answer on his or her card, the student marks out the box or places a marker on the number until there is a bingo. The instructor should write down the answers to the problems to make sure the winning student answered correctly.

Cross the Line – 1, 2, 6 (STRAND: various-computation):

Students line up facing the teacher. The teacher says, “Cross the line if ____.” If the students agree, they cross the line to the other side. If they do not agree, they stay put. For example, if the teacher says, “Cross the line if one plus one equals three,” students have to decide whether they agree and to cross or disagree and stay put. Any student who crosses when she shouldn’t (or fails to cross when she should) sits down. Continue until one person is left. As students are eliminated, make problems more challenging. Vary the kinds of questions you ask to cover time, money, geometry, measurement, computation, the calendar and so on.

Variation: Instead of being a game of elimination, all students continue participating, even if they were wrong.

The Yes-No Game – 1, 2, 6 (STRAND: various-computation):

This game is identical with Cross the Line, above, except it’s played sitting down. Each student will need a white board, marker and eraser. Direct students to draw a line across the white board about two inches down from the top (modeling here is helpful). This is where they’ll keep track of their points with tally marks. As above, the teacher makes mathematical statements. If the student agrees, he writes “Yes” on his white board. If not, he writes “No.” Students then hold up their boards.

I’m Out! – 5, 6 (STRAND: Number Sense-Subtraction):

This is a two-player game that requires a deck of cards (all face cards removed) and 15 markers (beans, paper clips, etc.) per player. The deck is placed between the players and each player takes a card from the top of the deck. Both players turn over their card and find the difference between the two numbers. The player with the lower number pays the difference in markers to the other player. The game ends when all cards have been played or when one player has all the markers and announces, “I’m out!”

Example: Player #1 turns up a 3 and player #2 a 5. Player one pays two markers ($5 - 3 = 2$) to player two.

Variation: More than two may play but on each turn only the players with the highest and lowest cards pay markers on that turn.

Math Go Fish – 2, 5, 6 (STRAND: Number Sense-Addition):

Use a standard deck of cards with tens and face cards removed. Aces are worth one. Deal five cards to each player then take out one card and set it aside without looking at it. If a player has any two cards that add to 10 (eg: $3 + 7$), s/he lays the pair on the table, face up. Once all players have laid down all their “10” pairs, the first player asks any other player for a card that would complete a “10” pair in his/her hand. If the other player has the requested card, he/she must hand it over and the first player may continue asking for cards, from the same person or anyone else. If the player doesn’t have the requested card, s/he says, “Go fish!” and the first player takes the top card from the stack of undealt cards. If a player runs out of cards, s/he draws a new one at the beginning of a new turn and continues play. When all the cards are matched up, there will be one card without a pair (the one removed from the deck at the beginning of the game). The person who winds up with this card is the winner.

Find Ten – 2, 5, 6 (STRAND: Number Sense-Addition: Finding Tens):

A math game similar to Concentration. In this game, children try to make a ten by turning over pairs of cards that total ten. You’ll need a deck of cards with face cards, tens, and jokers removed (aces = 1). Mix up the cards and place six rows of six cards face down between two players. (Three can also play or four in teams of two.) Taking turns, players turn over two cards. If the sum is ten, the player takes the cards and plays again. If the sum is other than ten, the cards are replaced face down and that player’s turn is over. The game is over when all 36 cards have been matched. The player with the most combinations of ten wins.

High-Low – 1, 2, 7 (STRAND: Number Sense: Number Recognition):

This is a game for 2-4 players and you’ll need a deck of cards with tens, face cards and jokers removed. Place the deck in the center. Each student draws 2 cards and makes the highest number possible (or lowest if playing with that objective). The greater/lesser number wins.

Variation: Players draw 3 (or more) cards and make the greatest/least number possible.

PRIMARY/INTERMEDIATE SKILL-BUILDING
GAMES & ACTIVITIES

Stop or Go – 1, 5, 6 (STRAND: Number Sense-Addition):

For 2 or more students, one six-sided die needed for each group of players. The object of the game is to be the first player to reach 25 points. Player A rolls the die. If a 1 is rolled, the player scores nothing and it's the next player's turn. If player A rolls other than a 1, the number is added to the player's score. Player A continues with a running total until a 1 is rolled and play switches to player B.

Variations: For Intermediate Students 1) Have students tally each number as it's rolled and ask them to draw probability conclusions when the activity is over. 2) Have students keep track of how many times each number is rolled and see if the number 1 fits the probability prediction of $1/6$.

Get to 100 – 1, 2, 6 (STRAND: Number Sense-Addition):

This game requires a deck of cards (face cards removed) for each group of players. Groups can be two or more. Each student is dealt 5 cards. Students are allowed to use the numbers on those cards to create addends that add up to as close to 100 as possible, either over or under. Each student plays 5 times (or however many times they decide) and tries to have his or her total score equal 0. See below for examples:

1st hand: 2, 3, 5, 5, 7
 $75 + 25 + 3 = 103$ Score: +3 (the sum is 3 more than 100)

2nd hand: 1, 9, 1 2, 3
 $91 + 1 + 2 + 3 = 97$ Score: -3 (the sum is 3 less than 100)

Total score for both hands: 0 (1st hand was 3 over 100, 2nd hand, 3 under)

Variation: Use only four cards to make 50.

Fingers – 1, 4, 6 (STRAND: Number Sense-Computational Fluency):

Students compete in groups of two for multiplication and subtraction but for addition, groups of three are okay (or even larger, depending on ability levels of students). For addition, students hold one or two hands behind their back and extend anything from 0 to 10 fingers. They reveal the number of fingers at a signal (1-2-3!). Whoever correctly states the sum of the fingers first wins the round.

For subtraction, two players can extend any number of fingers on one or two hands. The first to state the difference wins the round.

For multiplication two players can extend any number of fingers on one or two hands. The first to state the product wins the round. (NOTE: no student can hold up 0 fingers in multiplication, for obvious reasons.)

Variation: To make the game more challenging, have students play in groups of three.

NOTE: *Starting your math period with any of these mental math activities accomplishes three things. 1) Because students enjoy mental math, you can get everyone's attention simply by starting quietly; students will shush others so they can hear what you're saying. 2) You're warming them up, having them do some fun math before the period starts. 3) They'll start the math period in a more positive frame of mind: you've just challenged them with some fun math.*

Mental Math I – 1, 2, 6 (STRAND: Number Sense-Computational Fluency):

You'll need to tailor the level of difficulty to the grade/ability level of the class. For a class of fifth graders I might say, "Start with 5. Double it. Add 7, Subtract 9. Times 3. Divided by 6. Times 4. Raise your hand when you know the answer." Over the course of the year I increase the speed and the complexity, sometimes including fractions or factorials. For primary grades I use only addition and subtraction.

Mental Math II – 1, 2, 6 (STRAND: Number Sense-Computational Fluency):

First round: tell the kids, "I'll say a number, you double it." Start with easy numbers, for example 4, 8, 13 and work up to harder ones: 45, 63, 79. Second round: "I'll say a number, you double it and add one (or ten or . . .)." Third round: "I'll say a number, you double it and subtract one (or however many). You can also reverse it: Add one, then double it or subtract one, then double it.

Variation: Here's a great challenge for older students. It starts out pretty much the same: "I'll say a number, you double it and add 3. The number is 3." When 9, the correct answer is given, that becomes the new number to double and add 3. The new answer is now 21, which becomes the new number to double and add 3 and so on.

Mental Math III – 1, 2, 6 (STRAND: Number Sense-Computational Fluency):

Similar to Mental Math 1, above, except that you give the answer and students make up a problem to fit it. For example: "The answer is 16—give me two numbers." After several responses, "Give me three numbers." Then, three numbers and two different operations, then four numbers, four numbers with four three operations and so on. Then change the answer number.

Mental Math IV – 1, 2, 6 (STRAND: Number Sense-Computational Fluency):

Start by asking three students to each give you a number between 1 and 9 (but not 0), which you write on the board. The task is for students in the class to create various problems using those three numbers and any combination of operations. This is an opportunity to talk about grouping, exponents, and order of operations.

Mental Math V – 1, 2, 6 (STRAND: Number Sense-Computational Fluency):

This is a pre-algebra mental math activity suitable for all grades. A student gives you an input number which you write on the board., You perform an operation on it and write the output number. Students are to figure out what your rule is. Rule can be simple or challenging. Examples:

- +2 (or any number)
- - 1, x 2
- x 3
- + 5, X 2
- x 2 plus 2
- 1/10
- - 8 (or any number)

Mental Math VI – 1, 2, 6 (STRAND: Number Sense-Computational Fluency):

This is a group counting activity. Write two numbers on the board, for example, 1 and 5. The whole class begins counting: 1, 2, 3, 4, and so on. At a signal from you, they switch to counting by fives and continue 9, 14, 19 and so on. Vary the numbers each time and according to the grade level.

Mental Math VII (STRAND: Number Sense-Computational Fluency)

Ask students to share everything they know about a given number. For example, 5: five is a whole number, a positive number, an odd number, a prime number, the sum of the first two primes, a factor of every number that ends in 0 or 5, its factors are 1 and 5.

What Are My Numbers? – 1, 2, 6, 7 (STRAND: Number Sense-Comp. Fluency):

Write the following on the board or use the document camera:

$$\begin{array}{cc} + & = \\ \times & = \end{array}$$

$$\begin{array}{r} \div \\ - \end{array} \quad \begin{array}{r} = \\ = \end{array}$$

Think of two numbers whose sum, difference, product and quotient you write after the equal signs. For example, if the 2 numbers you think of are 2 and 6, then the sum = 8, the difference = 4, the product = 12, and the quotient = 3. (If the numbers don't divide evenly, let kids know.) Students use the answers to determine your two numbers. (Be sure to use and emphasize the math terminology—I call them “Power Words”). For primary students I use only addition and subtraction. As the year advances, make the problems more difficult.

What's My Number? – 2, 7, 8 (STRAND: Mathematical Reasoning):

This game is about students learning to be systematic, methodical and organized in their reasoning. Tell the students you're thinking of a number between 1-100. Their task is to determine what your number is using no more than 7 “yes or no” questions. As soon as a student asks, “Is it ___?”, the game is over, right or wrong.

It's always possible to determine the number in seven steps by asking questions that eliminate half of all remaining numbers. So the first question could be “Is the number between 1-50?”

Whether yes or no, half the numbers have been eliminated. Another opening question could be, “Is it an odd number?” Again, half the numbers are eliminated. (Keep a running record on the board or overhead.) The hardest question is the last one if students have narrowed their choices down to two numbers, but it doesn't have to be a 50/50 guess. There are questions they can ask to determine the number: If the remaining numbers, for example are 51 and 53 a student could ask, “Can we eliminate 51?” Whether yes or no, they now know the number you selected.

Another possible question: “Does your number end in a 1?” Students will probably come up with other ways of narrowing the choice.

Variation: When students have mastered this, ask them to figure out the maximum number of questions to ask to determine a number between 1-1000. Surprisingly, only three more questions are needed.

The Place Value Game – 2, 7 (STRAND: Number Sense-Place Value):

You'll need a deck of cards with all the 10s and face cards removed. All other cards are face value, aces being 1. Let's say you're doing a 5-digit game. (You can increase or decrease the number of digits depending on grade and ability levels.) Ask students to write on a piece of paper the following:

10	Th	Th	H	T	O
—	—	—	—	—	—

Next, you're going to show the class one card (number) at a time. The object of the game is to make the greatest number possible using those numbers. Once they've written the

number on their paper, it can't be erased, moved or changed in any way. (Erasures disqualify a student.) The game is partly luck, partly strategy. An added benefit: It's one that everyone can win.

Variations:

- Put the tens back in and use them for zeros.
- Have students make the least number possible.

Buzz – 2, 5, 6 (STRAND: Number Sense: Multiplication):

This is one of the most popular games for kids. Have the class stand. Start with anyone in the class and have students count off, starting with one. The rules are simple: no one can say any number that's a multiple of 7 or has a 7 in it. Thus, 14, 35 and 63 are taboo, as are 17, 27, 37, etc. Instead of these numbers, the student says, "Buzz!" If a student loses track of where the class is in counting, says the wrong number, says "Buzz!" at the wrong time or fails to say "Buzz!" that student sits down. Last one standing wins. Good game for learning multiples of 7. (The fun really starts when counting reaches the 70s!)

Variation: Same game, played with a different buzz number.

Bizz-Buzz – 2, 5, 6 (STRAND: Number Sense- Multiplication):

This is played just like Buzz, with 7s and multiples of 7 requiring the player to say "Buzz!". The game is changed (and made much more challenging!) by adding '3' into the game. Instead of saying any number with a '3' (3, 23, 63, etc.) or any multiple of '3' (9, 21, 42, etc.), the player says "Biz!". In addition, for any number with a '3' and a '7' (37) or that is a multiple of '3' and '7' (21), the player must say, "Biz-Buzz!"

Cooperative Buzz – 2, 5, 6 (STRAND: Number Sense- Multiplication):

In this game, the whole class will either win or lose. Begin by asking all students to stand. Teacher chooses a number (ie. 7) and explains that any number with a 7 in it or that is a factor of 7 is "taboo" and should not be spoken aloud. Instead, when presented with one of the taboo numbers, the student should sit down. The goal of the game is to get everyone in class to sit down (meaning no one has made a mistake). The teacher asks students to begin counting from the number one. Each individual student says a number. Rather than saying their "taboo" numbers, the students who "have" the number 7, 14, 17, 21, 28, etc. should sit down. If a student sits down on a wrong number, or if one fails to sit down when s/he should, then the game starts over. The teacher can offer an incentive for each time the class wins.

Backward Buzz (STRAND: Number Sense: Multiplication):

Played the same as regular Buzz but with one difference: Students count backwards from 100. Everyone still standing at 0 is a winner.

Salute – 1, 2, 6 (STRAND: Number Sense-Addition/Multiplication):

This game can be played by four but three is best. The teacher or the players can determine whether it's going to involve addition or multiplication. (Doesn't work for division or subtraction.) Each group of three needs a deck of cards with face cards removed. (Ace = 1) One player is the judge. (Players can rotate after every turn or after a game.) Let's say the game is addition. The judge gives each player a card, face down. When the judge says "Salute!" each player, *without looking at his/her card*, puts it up to their forehead so the judge and the other player can see it. The judge then announces the sum (using that word) of the two numbers. The first player to correctly announce his/her own number wins the two cards. Game winner is the one with the most cards. So, if player A sees that Player B has a 7 and the judge announces the sum as 13, Player A knows that her card is a 6 and says so.

Variation: For younger children, use only low ranking cards (e.g., ones, twos, threes, fours.)

Around the World - 6 (STRAND: Number Sense-Add/Sub/Mult/Div):

You'll need flash cards for whatever basic facts you're working on. Pick one student to start the game. She picks any other student to stand behind. You then show them a flash card problem. First student to answer correctly gets the card and moves on to the next student. Take only the first answer given. If it's wrong, that student does not get a second try. Instead, the other student gets to answer. In case of a tie, go to the next card. I usually allow 5-10 seconds, depending on the level of difficulty. Any student who goes "around the world" (beats everyone else in the class) automatically wins the game. Otherwise, it's the student with the most cards.

Math Facts Race – 2, 5, 6 (STRAND: Number Sense-Add/Mult):

Arrange the class into two or more teams and draw a grid on the board for each team. The grid need only be 4 x 4 or 5 x 5 and the teacher can write in the numbers that the class needs to work on. For example, across the top the numbers might be 4, 5, 7, 9 and down the side 3, 6, 2, 8

When the chart is set, say "Go!" One person on each team races to the board and fills in any square on the math facts grid. For example, if you are reinforcing addition facts, the student writes the number 6 in the square at which the 4 column and the 2 row meet ($4 + 2 = 6$).

Emphasize that it is important for all members of a team to watch what their teammates write. If any student on either team sees a mistake made by a teammate during the game, he or she can use his/her turn to correct that error.

If you make this a "quiet game," it will hold down the "oooo's" that are sure to signal an error, and also further emphasize the importance of team members paying close attention to one another. The first team to fill in all the squares on their grid is the winning team *if* all the answers on their chart are correct. This game works also for multiplication.

Twenty-five – 2, 6 (STRAND: Number Sense-Add/Sub):

This is a game for two or more players. You'll need a deck of cards, ace-10 (ace = one) for each group of players. Before the students play the game, review the number pairs that add to 10. Then have the students look for ways to use this knowledge to help them add and subtract faster.

Place the deck in the middle. The first person turns over the top card and places it face up in the center of the play area. The next person turns over the next card, adds the number to the card already played, says the sum out loud, and places the card on top of the previously played card. The next person turns over a card and adds the number to the sum of the first two cards. Play continues in this way until someone has a card that, when added, will give a sum greater than 25. When that happens, the player must *subtract* rather than add. Play continues until someone gets a sum of exactly 25. The player who gets a sum of exactly 25 wins that round and goes first in the next round.

What's My Rule? – 1, 2, 3, 7 (STRAND: Mathematical/Logical Reasoning):

Draw a large circle on the board. All the numbers you write inside the circle follow a certain rule; none of the numbers outside the circle follow the rule. As you add numbers inside and out, students try to determine what the rule is. The easiest example is evens in the circle, odds outside the circle. Other possibilities include factors of 12; multiples of 4; divisible by 3 or 5 or . . . ; primes and composites; two-digits in the circle, one- and three-digits outside; numbers less than 20, numbers greater than 20; regular quadrilaterals in, irregular quadrilaterals out; or try a trick question on the kids: only numbers written with straight lines (1, 4, 17, 41) in the circle, only numbers with curved lines (0, 3, 6, 8) out; this means you can't use 2, 5 or 9 because they have both straight and curved lines. This game can also be easily adapted to other subject areas.

More possibilities:

- fractions (even vs. odd denominators; lowest terms vs. not in lowest terms)
- numbers that end in ____
- starting with 1 (or even $\frac{1}{2}$), numbers in the circle double
- numbers with a given number in the tens place
- numbers in the circle have digits that add to a certain total (57, 183, 48)

- numbers in the circle increase (or decrease) a set amount each time
- fractions (less than $\frac{1}{2}$ outside the circle, greater than $\frac{1}{2}$ inside the circle; $\frac{1}{2}$ and fractions equivalent to $\frac{1}{2}$ can't be placed in or out, a clue for students)
- large numbers with consecutive digits inside them in the circle (e.g.: 1034588 and 267814 inside)

Beat the Calculator – 2m 6 (STRAND: Number Sense-Computational Fluency):

Player #1 uses a calculator, player #2 uses brainpower. Two cards are shown (or two polyhedral dice are rolled). Player #2 tries to find the product of the two numbers (sum for primary) before player #1 is able to do the same problem on the calculator.

Squeeze Play – 2, 6, 7 (STRAND: Number Sense-Computational Fluency)

You will need a set of cards, 0-9 (tens can be used for 0) for each player. Each player takes six cards and makes two three-digit numbers. The idea is to get as great a range between the two numbers as possible. After the players have made their numbers, three more cards are turned over. The first card is the hundreds' place, the second, the tens' place and the third, the ones' place. Players score a point if the final three-digit number falls between the first two numbers they made. More cards can be used to build larger numbers.

BUG – 2, 5, 6 (STRAND: Number Sense-Computational Fluency)

This game works for both primary (with addition) and intermediate (multiplication). You can either make a simple game board to run off whenever you want to play the game or you can have the students draw one on a piece of paper. (See below.) To play: Students start by standing. Teacher rolls two dice, tells class the numbers. Students then add or multiply them and enter the answer in the "B" column. At this point, each student needs to decide whether to keep playing in round one or to sit down. If she chooses to sit, she keeps all her round 1 points but can't play again until round 2. If she chooses to stand, she keeps playing and adding to her total. However, if a 1 is rolled on either die, all students who are still standing lose all their points for that round. Everyone totals their points and the game moves to round 2, the "U" column. Game continues until the end of the third round, when students add all their points.

B	U	G

Variation for younger children: Use one die only. Children write down each number as it's rolled and add it to the preceding number or total. If a 1 is rolled, all those still standing lose all their points for that round.

Twelve and You're Out! – 2 (STRAND: Logical Reasoning)

This is a great game where you really have to think ahead. It sounds simple, but . . .

1. Put everyone in groups of between 2 to 4 kids.
2. The first person says either **1**, **1,2** or **1,2,3**
3. The next person continues on and can say an additional one, two or three numbers. (e.g., if the first person says "1, 2", the second person can say either **3** or **3,4** or **3,4,5**)
4. Continue around the group until one person is forced to say "12". They are now out.
5. Start again from step 2.

Variation: Make the number something other than 12.

Extension: Ask students to discover the optimal strategy for winning a two-player game. (Answer: first player counts 1-2-3, then, no matter what the second player does, first player can stop counting on 7. After that, victory is assured!)

INTERMEDIATE SKILL-BUILDING GAMES & ACTIVITIES

Twinks – 2, 5, 6 (STRAND: Number Sense):

This game requires a deck of cards with all face cards removed. All cards are face value with aces being one. Two to six people may play but works best with four. Player #1 lays out four cards face up. The first player to find a combination equaling 12 (using 2, 3, or all 4 cards) calls "Twinks" and takes all the cards in the combination plus any cards in the underneath piles. All four number operations may be used. If someone calls "Twinks" incorrectly and is challenged, that player forfeits all cards to challenger.

Example: Player one turns over an 8, a 4, a 2, and a 5. Player three calls "Twinks" and says eight times two minus four is twelve and collects all three cards (plus any cards that may be under those piles). The player with the most cards at the end of the game is the winner. If no combination equaling 12 is found, four more cards are laid out on top of the existing four.

Digit-Place Game – 2, 3, 7, 8 (STRAND: Mathematical Reasoning):

The goal of the game is for students to use logical reasoning to deduce a secret three-digit (or, more difficult, a four-digit) number. The teacher (or leader) writes down a three-digit number but doesn't disclose it. (All the digits must be different). Students take turns guessing the number. With each guess, the teacher gives one of the following clues:

- place – correct digit and in the correct place
- digit – correct digit but in the wrong place

- nothing – no digits are correct (but ask students what valuable information this provides) As students get more information about the number, they start making educated, rather than random, guesses.

Example: The secret number is 173. A student guesses 346. I say no, but one digit is correct and I write it on the board:

346 - 1 digit

Another student guesses 463. I say no, but one digit is correct and in the correct place:

463 - 1 place

And the game continues like this.

Color Square Game – 2, 3, 7, 8 (STRAND: Logical Reasoning)

Introduce this game with a 3x3 grid using three colors and three of each color.

(Subsequent games can use grids of a larger size. A 4x4 grid uses four each of four colors and so on.) Ahead of time, prepare a “key” grid with each of the nine squares colored (or use letters to represent colors). All the squares of one color are linked together along one full edge (i.e.: they can’t be separated nor can they be linked only diagonally). Label the rows/columns 1-2-3. A student asks for information for any row or column. For example, a student asks for row 1.

	1	2	3
1	G	G	B
2	G	R	B
3	R	R	B

Teacher writes: 1 blue, 2 green

The teacher then writes the number of times each color appears in row one (see above). Students continue to ask for information and deduce the color of each square. Challenge your students with a 4x4 (4 colors, 4 of each), 5x5, even a 6x6 grid.

Multiplication Bingo – 5, 6

MULTIPLICATION BINGO				

Duplicate and pass out the game board and write the following products on the board (or use the doc camera). **0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 15, 16, 18, 20, 21, 24, 25, 27, 28, 30, 32, 35, 36, 40, 42, 45, 48, 49, 54, 56, 63, 64, 72, 81.** Tell students to choose 25 of these products and write one in each of the 25 boxes above. Using a complete set of multiplication flash cards, call out the problems one at a time until someone has a Bingo.

Variation: Use some of the other Bingo possibilities: 4 corners, letter T, frame, letter X, etc.

High/Low Fractions – 2, 5, 6 (STRAND: Number Sense-Fractions):

Use a standard deck of cards with tens and face cards removed. Aces are worth one. Divide the deck equally between two players, face down. Each player flips over the top two cards, placing the lower number over the higher one to create a fraction. The greater fraction takes all four cards. In case of a tie, procedure is repeated and winner takes all eight cards. When one or both players run out of cards they will both shuffle the cards they won and continue playing until one player has all the cards.

Variation: Players can create improper fractions by placing the higher number on top.

Number Tic-Tac-Toe – 2, 6, 7 (STRAND: Number Sense/Math.

Reasoning):

Students play in pairs. Each pair makes a standard tic-tac-toe grid. Instead of using Xs and Os, however, students use the numbers 0 through 9 (or 0 through 12 for a greater challenge). Each number can be used only once during a game. The object of the game is to complete any row, column or diagonal so that two of the three numbers add up to the third. (The order of the numbers does not matter; for example $9 + 3 = 12$.) The first move may NOT be in the center. (The first player will always win if allowed to do so.) Second and subsequent moves, however, can be anywhere on the grid.

Triplets – 2, 7 (STRAND: Logical Reasoning):

Played just like tic-tac-toe except *both* players use Xs (or Os). Use the regular tic-tac-toe grid (9 squares) to start with, moving to larger grids (4x4, 5x5) as kids get better at the game. (NOTE: in the 9 square game, the first move may not be in the center square; the first player will always win if allowed to do so, the same as Number Tic-Tac-Toe above.)

Extension: There is a different *maximum* number of moves for each level of the game (4x4, 5x5, 6x6 grids, etc). 1) Ask students to find that number for each level. 2) Ask them to show numerically (i.e., with a number sentence) the rule for each level. Here are some examples:

<u>size of grid</u>	<u>number sentence</u>	<u>max # of moves</u>
3 x 3	$(3 \times 3) - 4 =$	5
4 x 4	$(4 \times 4) - 6 =$	10
5 x 5	$(5 \times 5) - 8 =$	17

Subtraction Pole Vault – 2, 6 (STRAND: Number Sense):

This game can be played solo or with 2 or more players. You'll need a calculator (to verify answers, paper and a deck of cards with Jacks, Queens, and Kings removed. Ace = 1, 10 = 0. The object is to get as close to 0 as possible, without going below 0, after five subtractions from a target number.

Shuffle the cards, place deck face down. The target number is 250 (or whatever the teacher or players decide on). Players take turns doing the following:

- Player 1 turns over top two cards and makes a two-digit number. Subtract this number from 250 on scratch paper, check on calculator. Player 2 then does the same.
- Turn over the next two cards, make a two-digit number and subtract from the result in step one.
- Do this three more times.
- Whoever is closest to 0 (without going over) after five rounds, wins.

Example:

Turn 1: Draw 4 & 5	Subtract 45 or 54	$250 - 45 = 205$
Turn 2: Draw 0 & 6	Subtract 6 or 60	$205 - 60 = 145$

And so on.

Dados (Spanish for “dice”) – 2, 7: (STRAND: Probability):

This is a game for two players. Two dice are needed. Players decide who will be A and who will be B. Player A rolls the two dice. If the sum rolled is 2, 3, 4, 10, 11, or 12, Player A gets one point, Player B, zero. If the two dice total 5, 6, 7, 8, or 9, Player B gets one point, Player A, zero. First player to 10 points wins. Ask students to predict who is most likely to win (point out that Player A has six numbers, Player B only five).

After students have played, ask them the following:

- 1) How many players with 5, 6, 7, 8, 9 won? (Should be a majority.)
- 2) Is the game fair? Why, or why not? (No. 5, 6, 7, 8, 9 have 24 ways to score a point; the other sums have only 12 ways.)
- 3) Do the results (who won/who lost) support the answer to question 2? (Should be yes.)
- 4) Ask students how they might change the game to make it fair. (Suggestions could include alternating who is A and who is B; players take turns picking the numbers that will give them points; one player takes odds, the other, evens.)

After students play a second round, ask them to explain why 5, 6, 7, 8, and 9 will almost always win.

Aim for Zero – 2, 6 : (STRAND: Number Sense):

This is a subtraction game for two or more players. Each player writes a target number (50, 75, etc.) at the top of a piece of paper. The first player can subtract any number from 1-10 from the target number and write the difference. The second player then does the same, choosing any number between 1 and up to 10 more than the number the first player selected and subtracting that number from the new difference. For example, the first player subtracts 8 from 50, leaving 42. The second player can subtract any number from 1 to 18 (10 more than the 8 the first player subtracted) from 42. Play continues with each player subtracting any number from 1 up to 10 more than the number subtracted by the other player. The winner is the first to reach zero.

Primary Variation: Make the target number 20 or 25. Students can subtract any number from 1 to 10, period.

Variation: Play as addition game with 0 being the starting number and working up to the target number.

Fast Facts – 2, 5, 6: (STRAND: Number Sense):

This game is for 2-4 players. They will need a deck of cards, ace to ten (ace = 1, 10 = 0, no face cards; other cards are face value). The dealer places five cards face up on the table. One more card, the target number, is turned face up. Each player then tries to use addition, subtraction, multiplication and/or division to combine all five cards to equal the target number. Each card must be used and may be used only once. The target number is not used in the calculations. The first player with a correct solution takes all six cards and six more cards are laid out. (This game is similar to the commercially produced Krypto.)

Example: The five cards are 7, 3, 5, 2, 4 and the target number is 3. One solution:

$$7 \times 4 + 2 \div 5 \div 2 = 3$$

Variations:

- Younger students can use fewer than five cards to make the target number.
- Turn up two target cards to make a two-digit number.

NOTE:

Many of the intermediate games can be modified for play by primary students by eliminating higher ranking cards from the deck. For example, for 25 and Salute, use only Ace (1) through 4 or 5.