Math Games Build Resilient Learners

Math Games= Powerful Teaching Strategy

- 1. Make math fun and motivating: meaning context for repetitive practice and exploration of concepts
- 2. Multi-sensory, manipulative experience-use all learning channels
- 3. Complement any existing math program, reaches all levels in a class
- 4. Beyond rote memory-connections through patterns, strategy and talk
- 5. Rich in problem solving opportunities
- 6. Language and communication: Writing in math journals

Games are an Excellent Way to Connect Mathematical Content to Mathematical Practice

- Students are engaged with subject matter.
- Students must communicate their thinking with other players.
- Students use flexibility in operations during play.
- Students analyze their own choices and those of their opponents.
- Students reason inductively using the generated data in play.
- Students must record their mathematical expressions.

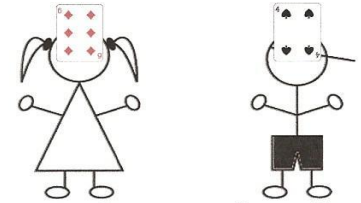
SALUTE

Box Cars "All Hands On Deck" Mystery Number (adapted)

Concepts: Missing Addend, Factor
Equipment: Cards 0-12 (J=11 Q=12 K=0)
Goal/Object: Figure Out value of the card on your head

Usually 3 players with one player taking the role of "General". The General says "salute". The other two players take the card from the top of their deck and WITHOUT LOOKING AT IT place it on their forehead so everyone else can see what the card on their forehead is. The General adds the two cards together and says:

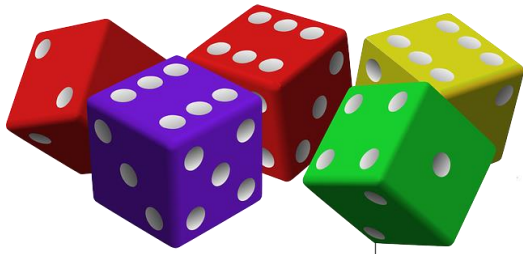
"The sum of your two cards is...."



The two players then use the sum and the card they can see on their opponent's forehead to try and figure out their own card.

Variations: (1) Multiplication (take out 0s)
4 Players (one General, 3 soldiers)
Red = neg integers / Black = pos integers

100 Board Wipe Out



Level: Grade 3 and up

Skills: Multi-operations (+ - x ÷ √ X^2), Order of Operations

Players: 2-3 players working together as a team

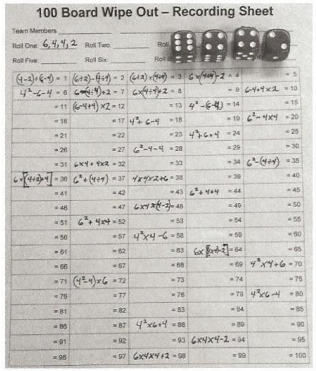
Equipment: Dice Tray, pencil, recording sheet per player/team

Objective/Goal: To make equations for 1-100 in fewest rolls

Getting Started: Team One decides whether to roll 3, 4 or 5 dice and records the roll in the Roll 1 space on the recording sheet. Team One then creates math sentences using the numbers rolled that have the numbers 1-100 as answers. They record each math sentence on the recording sheet in the space for the answer. Each math sentence must use each number rolled. For example, if 4, 4, 2 and 6 are rolled then each math sentence must contain 4, another 4, 2 and 6. Once the team has exhausted all the possibilities for Roll 1, they can take Roll 2. At the beginning of each roll, the team can decide to roll 3, 4 or 5 dice. In other words, they don't always have to roll the same number of dice for every roll.

Example: The team rolled 4, 4, 2 and 6 and made the following math sentences, (utilizing the rules for Order of Operations where necessary - see examples with answers = 10 and = 12):

4 x 4 x 2 + 6 = 38 (6 – 4 + 4) x 2 = 12 6 – 4 + 4 x 2 = 10 4^2 x 4 + 6 = 70 etc


100 Board Wipe Out – Recording Sheet


100 Board Wipe Out – Recording Sheet

In the examples, the team first rolled 4 dice and using those numbers, made equations for 30 answers before rolling a second time. For the second and third rolls, they rolled 5 dice and had written math sentences for 61 answer before the math period ended (they said they could have kept going).

Variation: (1) Teams can use dice other than regular spotted dice, such as 10-sided 0-9, 12-sided 1-12, 20-sided 1-20 or 30-sided 1-30 dice.

(2) Teachers may place restrictions on equations to make it more challenging such as "Every math sentence must include at least one multiplication component".

100 Board Wipe Out – Recording Sheet

Team Members _____ _____ _____ Date: _____

Roll One: _____ Roll Two: _____ Roll Three: _____ Roll Four: _____

Roll Five: _____ Roll Six: _____ Roll Seven: _____ Roll Eight: _____

= 1	= 2	= 3	= 4	= 5
= 6	= 7	= 8	= 9	= 10
= 11	= 12	= 13	= 14	= 15
= 16	= 17	= 18	= 19	= 20
= 21	= 22	= 23	= 24	= 25
= 26	= 27	= 28	= 29	= 30
= 31	= 32	= 33	= 34	= 35
= 36	= 37	= 38	= 39	= 40
= 41	= 42	= 43	= 44	= 45
= 46	= 47	= 48	= 49	= 50
= 51	= 52	= 53	= 54	= 55
= 56	= 57	= 58	= 59	= 60
= 61	= 62	= 63	= 64	= 65
= 66	= 67	= 68	= 69	= 70
= 71	= 72	= 73	= 74	= 75
= 76	= 77	= 78	= 79	= 80
= 81	= 82	= 83	= 84	= 85
= 86	= 87	= 88	= 89	= 90
= 91	= 92	= 93	= 94	= 95
= 96	= 97	= 98	= 99	= 100

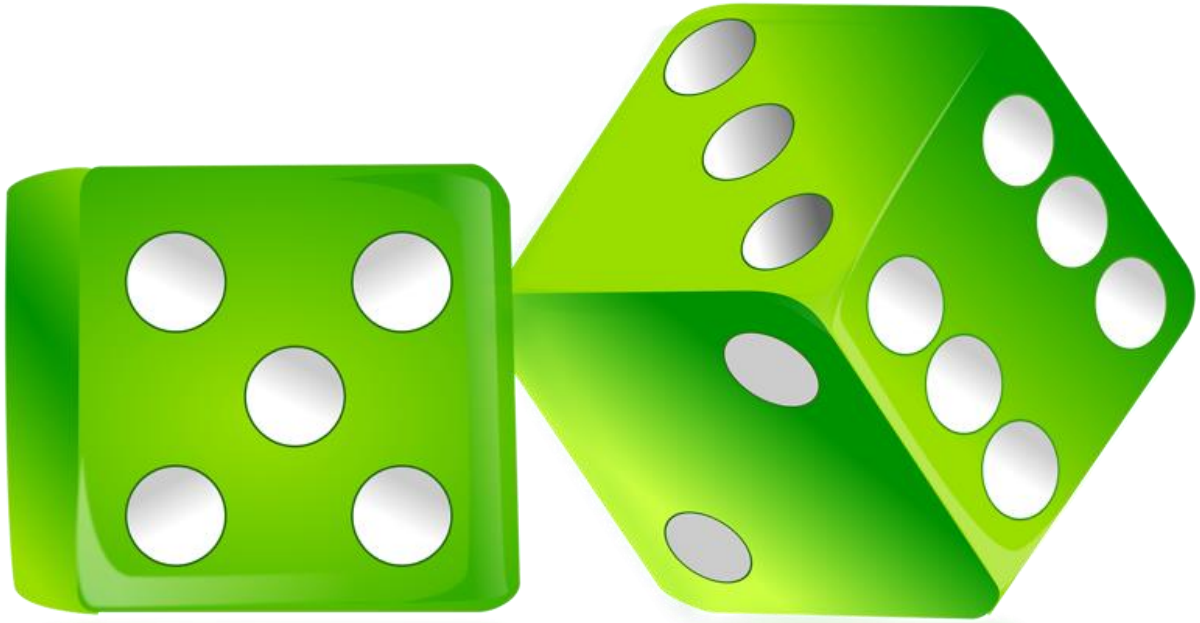
Betweeners

Adapted from Double Dare You - Revised © 2017

Round	Least Name / Answer	Between *Win* Name / Answer	Greatest Name / Answer
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

- Three players and play for between Place Value Answer eg. 254 654 114 **254 Wins**.
- Players first agree to roll regular dice or select cards (use 0-9) for the entire game.
- Each round, players roll dice/select cards and arrange them to make their answer.
- Players arrange the three answers: Least, Between, Greatest.
- Between WINS the round & scores one point, (if a tie, no points awarded).
- Record players and their answers in the correct location per round.

Variation: Play Math Sentence Answer eg 2+5x3=17 (4+4)x2=16 (6+1)x2= 14 **16 Wins**



MULTIPLICATION SCRAMBLE

From "Dice Works" page 69. Roll two special 1-12 dice at a time. Multiply the factors, place the math sentence on the appropriate space on your side. If the space is already filled, then no space is filled in for that turn. First player to fill in their side is the winner.

0 - 9		0 - 9	
10 - 19		10 - 19	
20 - 29		20 - 29	
30 - 39		30 - 39	
40 - 49		40 - 49	
50 - 59		50 - 59	
60 - 69		60 - 69	
70 - 79		70 - 79	
80 - 89		80 - 89	
90 - 99		90 - 99	
100 - 109		100 - 109	
110 - 119		110 - 119	
120 - 129		120 - 129	
130 - 139		130 - 139	
140 - 149		140 - 149	

THE BIG ROUND UP

From "Dice Works" page 72. Roll two special 1-12 dice at a time. Multiply the factors and round the product to the nearest 10's place. Circle the answer on your row. If the space is already filled, then no answer is circled for that turn. First player to fill in their side is the winner.

0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
0	10	20	30	40	50	60	70	80	90	100	110	120	130	140

Reach For The Top

Box Cars & One-Eyed Jacks inc.

one	two	three	four	five	six	seven	eight	nine	ten	eleven	twelve
											
1	2	3	4	5	6	7	8	9	10	11	12

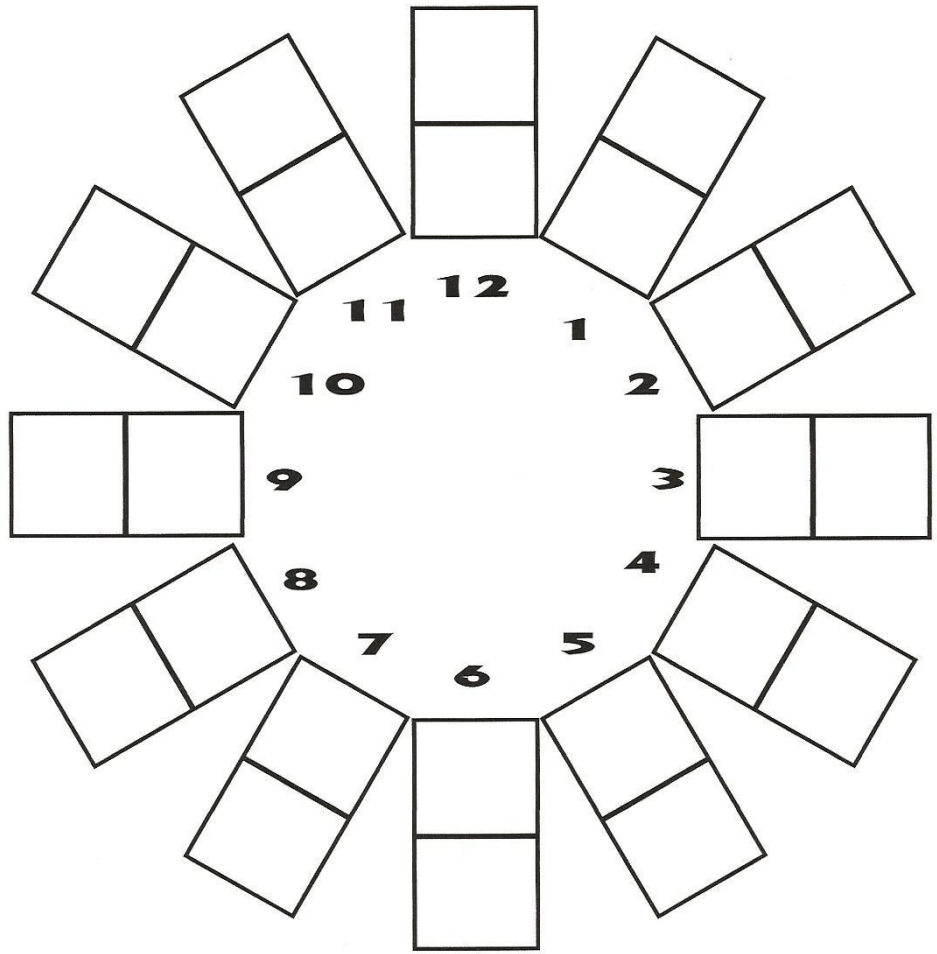
- Roll 2 dice and add.
- Record math sentence above answer.
- First to "Reach the Top" wins.

- K's use 1-12 die or spotted 12 sided die.
- Can use multi-operations: e.g. roll 6 and 2

6 + 2 = 8	6 ÷ 2 = 3	**Record all 4.**
6 - 2 = 4	6 x 2 = 12	

K-2

CLOCKOMINOES



- 1 set dominoes per player, upside down and shuffled.
- Player One draws a domino, adds and places in correct place on clock.
- Player Two takes their turn.
- If a player draws a domino that has already been filled in on the clock, they must stack it and their opponent then plays.
- The player who completes their clockface first is the winner.
- ▯▯ Double blank, if drawn, goes in the middle but is not needed to win.

ROUNDING OFF BIG TIME

LEVEL: Grade 4 and up

SKILLS: rounding numbers, place value

PLAYERS: 2

EQUIPMENT: cards (Ace=1) - 9, one gameboard per player (see reproducibles), pencil

GETTING STARTED: Each player turns over three cards to make a three-digit number. Player decides on which number to make and rounds this to the nearest hundred to determine which space to fill in on their gameboard.

EXAMPLE: 7, 3, 8 can be 738, 783, 837, 873, 387, or 378

The player then records this number on their gameboard opposite the space it was rounded to.

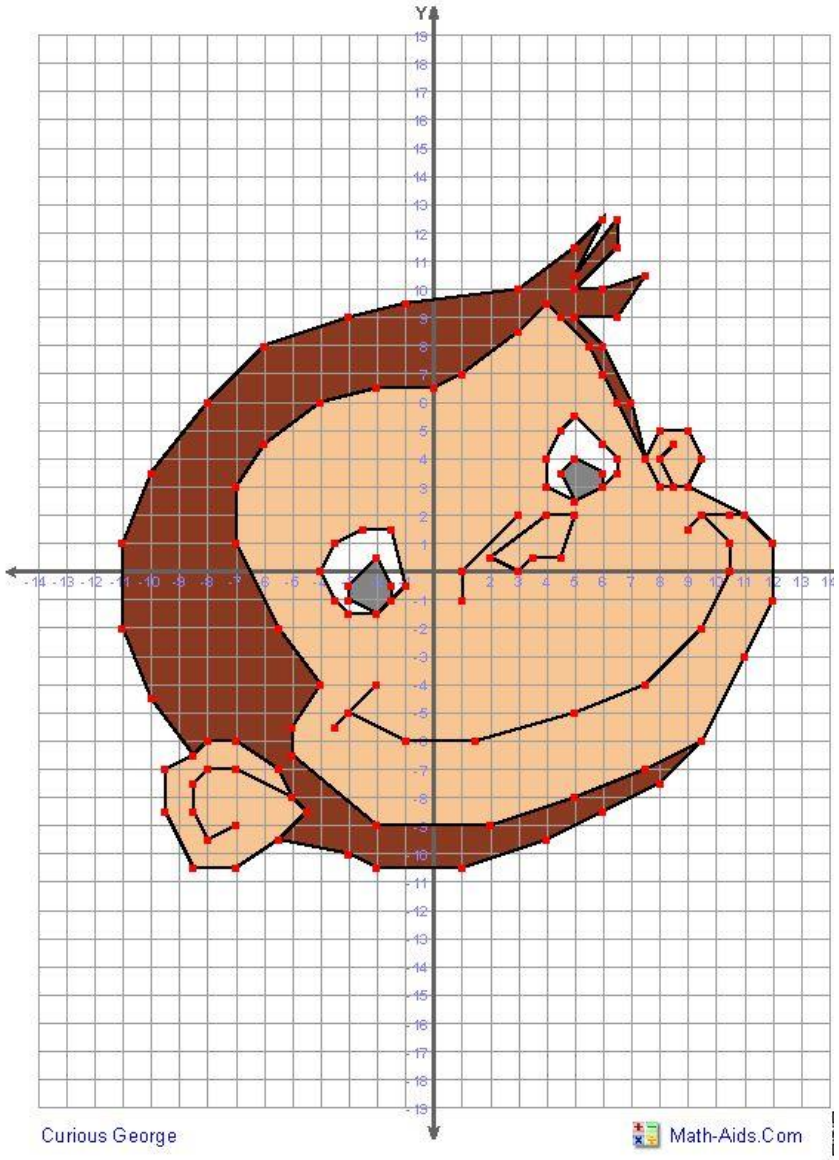
100	135
200	238
300	311
400	387
500	463
600	589
700	728
800	764
900	
1000	982

Given this gameboard if a player now turned over a 3, a 5 and a 6, the player misses that turn because all possible combinations of those numbers have been filled. The first player to complete their gameboard wins.

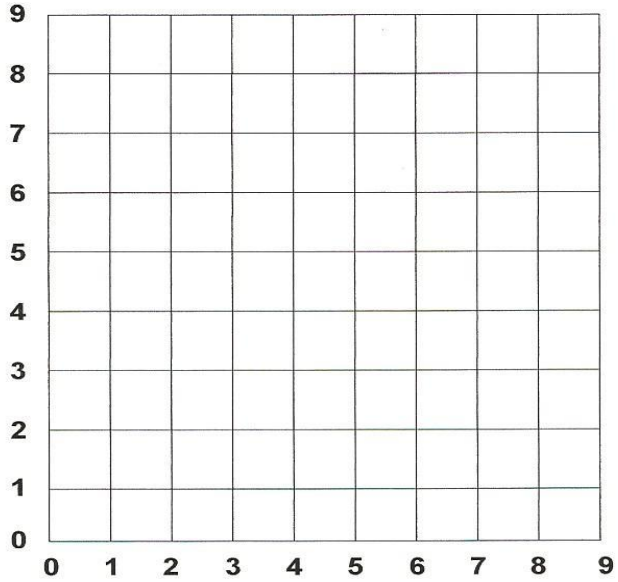
VARIATION: This can be played as a solitaire game. Players are allowed three chances/strikes before they are out.

ROUNDING OFF BIG TIME

100	
200	
300	
400	
500	
600	
700	
800	
900	
1000	



PLOTTING ALONG GRAPH

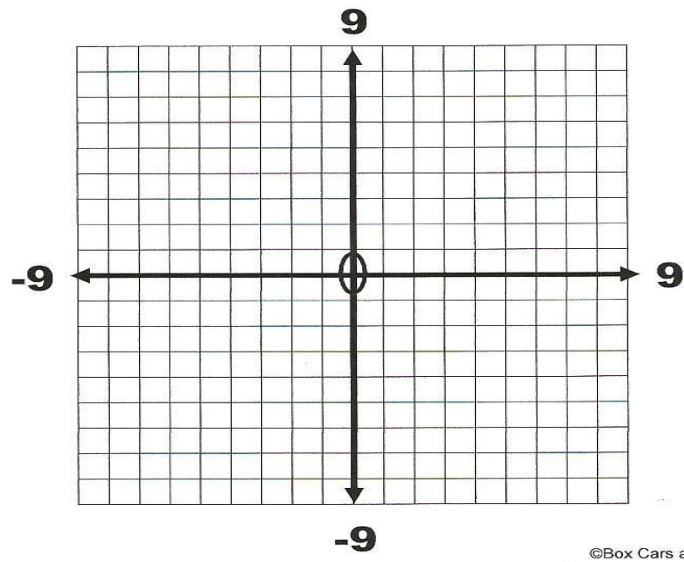


Players each have two 0-9 dice (younger players can use a Double Regular Die with outside die representing the horizontal X and inside die representing the vertical Y).

Players take turns rolling their dice to plot points (x,y) on their graphs.

First player to plot 3 adjacent points in-a-row for a straight line, (vertical or horizontal or oblique ie diagonal) wins the round.

Variations:
1 - Players must plot one line in each quadrant. Only one point per roll can be plotted.
2 - Players may plot non-adjacent points to create straight lines.



HORSE RACE - PRIMARY ADDITION

LEVEL: K - 2

SKILLS: adding to 12, commutative property of addition, fact families

PLAYERS: 2 (1 vs 1)

EQUIPMENT: tray of dice (each player needs 18 of their own color), gameboard

GOAL: to have the greatest number of dice on your side of the "racetrack" at the end of the game

GETTING STARTED:

Each player takes 18 dice of one color and picks a side of the dice tray to be their "racetrack". Each player picks up a pair of dice, rolls, and calculates their sum. The player with the greatest sum puts their dice into their side of the racetrack. Both players verbalize their sums.

EXAMPLE:

PLAYER ONE

PLAYER TWO

MATH TALK Player One says "8 is a greater sum than 6"

The player with the greatest sum places their dice in their side of the racetrack. The player with the least sum tosses their dice into the lid.

Players each pick up another pair of dice, roll and compare their next sums. In the event of a TIE or EQUAL SUM – both players put their two dice into their side of the racetrack.

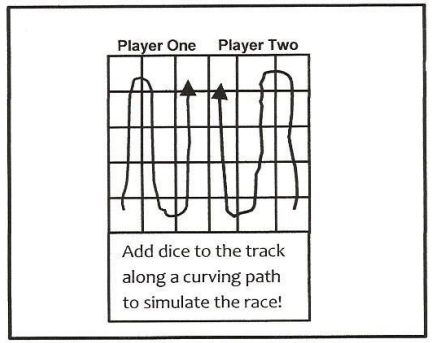
Play continues until both players' 18 dice have been rolled out. The player with the greatest number of dice on their side of the racetrack wins.

Level 1 : Addition to 12 - Players roll two dice and add them

Level 2 : Addition to 18 - Players roll three dice and add them.

Level 3: Multiplication to 36 - Players roll two dice and multiply them

Level 4: Multiplication to 72 - Players roll three dice, choose two to add together, then multiply the sum by the third.



ROLL ON... DECIMALS

(Submitted by Nancy McGuire)

LEVEL: Grade 6 - 9

SKILLS: Decimal place value, adding decimals, probability, reasoning

PLAYERS: Whole class or small group

EQUIPMENT: Two ten-sided (0-9) dice, gameboard (see reproducibles)

GETTING STARTED: The goal of the game is to add decimals to get as close to a whole number as possible. A roller is selected for the group. The dice are rolled and all players use these numbers to make a decimal number on their gameboard. Players now decide how they are going to set the numbers rolled. Players may use a 0 in combination with the rolled numbers to create any possible decimal number. For example, if a player rolls a 6 and an 8 they can create the following numbers:

.86 .68 .068 .086 .806 .608

The running total will determine the player's best choice.

e.g. Current total = .75 and player rolls 4 and 2
It would be best to form .24 and add to equal .99 (.01 from a whole number).

All players must construct a decimal before the next roll is made. Roller continues rolling for a total of five rolls. Players must use the numbers rolled from all five rolls.

Player closest to any whole number wins the point.

EXAMPLE:

Roll #1: 3, 4
Roll #2: 7, 0
Roll #3: 3, 1
Roll #4: 8, 9
Roll #5: 4, 0

In the event of a tie, play out a sixth roll to determine the winner.

Player One's Gameboard

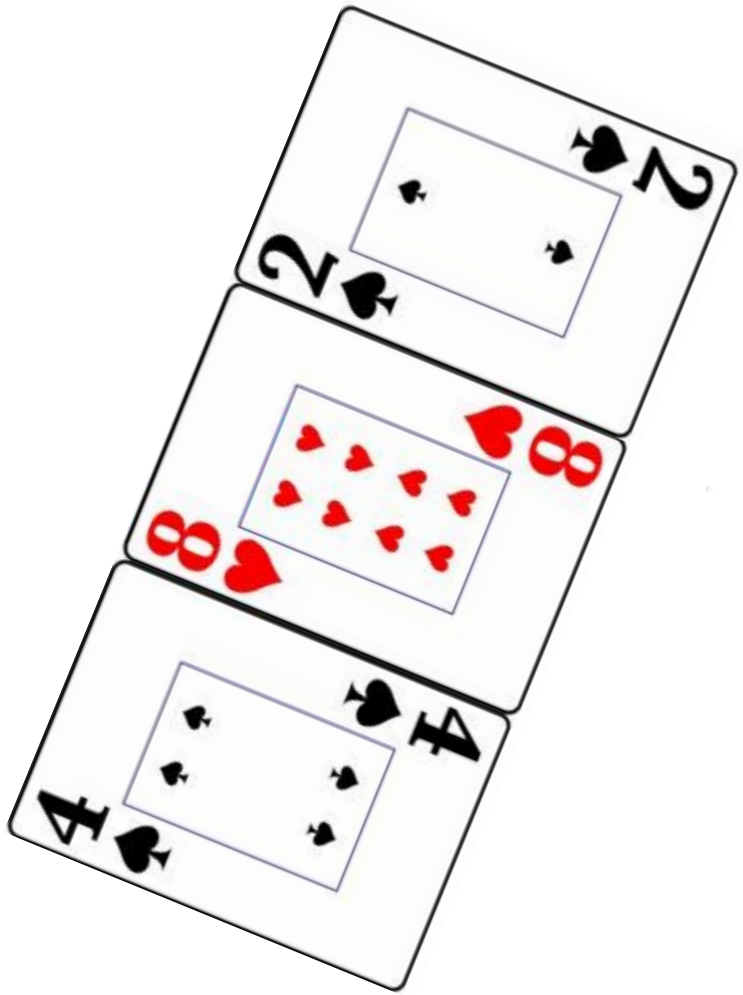
Roll Number	Ones	Tenths 10ths	Hundredths 100ths	Thousandths 1000ths	Running Total
1		3	0	4	.304
2		0	7	0	+ .070 = .374
3		3	1	0	+ .310 = .684
4		0	8	9	+ .089 = .773
5		0	4	0	+ .040 = .813
				(+/-)	-.187

Player Two's Gameboard

Roll Number	Ones	Tenths 10ths	Hundredths 100ths	Thousandths 1000ths	Running Total
1		4	3	0	.430
2		0	0	7	+ .007 = .437
3		0	1	3	+ .013 = .450
4		0	8	9	+ .089 = .539
5		4	0	0	+ .400 = .939
				(+/-)	-.061

Player Two scores 1 point.

VARIATION: Subtract from one whole number to get the closest to 0.



What's the Difference?

LEVEL: Grade 2 - 5

SKILLS: Subtraction of three-digit numbers

PLAYERS: 2 or more

EQUIPMENT: 1 deck of cards Ace – 10 (Ace = 1 and 10 = zero), 1 gameboard for each player.

GETTING STARTED: Each player draws a 3 by 2 grid as a gameboard and the cards are shuffled. Then a card is drawn and placed face up. All players write the number on the card into a space on their gameboard. Five more cards are drawn and players fill in the rest of their gameboards. Once all six spaces are full, players subtract the bottom number they made from the top number. The player with the smallest difference scores a point. If the bottom number is larger than the top, they "strike out" and can't score for the round. Play to ten points.

EXAMPLE: The six cards drawn, in order, are 6, Ace, 7, 4, 10 and 8. Three players build their gameboards like below. Player One strikes out, while Player Three wins with a difference of 141.

	Player One				*Player Two*				*Player Three*		
	6	4	0		6	7	1		7	8	1
–	8	7	1	–	4	8	0	–	6	4	0
	Strikeout!			=	1	9	1	=	1	4	1

VARIATION: For less experienced players, draw only four cards and build two two-digit numbers.

Source: All Hands on Deck for Families

www.boxcarsandoneeyedjacks.com

A DOMINO TWIST ON TRADITIONAL WAR GAMES

The traditional card game "WAR" is a favorite of all ages. These games can be easily adapted for use with dominoes. The following games are perfect for repetition and practice when a skill or concept is first introduced. Repeated exposure and repetition is the goal. War type games are excellent for players of different skill levels and cross graded groupings. Students are encouraged to verbalize their answers throughout the game. The games can be played for a set period of time, or alternatively until all dominoes are played out. The following rules using dominoes can be adapted to work on specific skill areas: all operations, place value, fractions and more. NOTE: This type of game is a great way to use buckets of mismatched domino sets that often accumulate in the classroom.

Note: The basic rules of WAR will not change from variation to variation, only the skill or concept being covered.

BASIC RULES – ADDING WAR

LEVEL: Grade 1 and up

SKILLS: adding

PLAYERS: 2

EQUIPMENT: one or two sets of dominoes (or a bucket of mixed sets)

GOAL: To be the player with the greatest sum.

GETTING STARTED: Dominoes are placed face down, shuffled and divided evenly between both players. Both players draw a domino from their own draw pile and add the total pips. Players verbalize their math and compare sums. The player with the greatest sum captures their opponent's domino and places it into their point pile. Play continues for a set period of time. The player with the most dominoes is the winner. When a players draw pile is depleted, they place all of their point pile face down, reshuffle and resume play.

EXAMPLE: Player One draws [2|3]. Player Two draws [4|1]. Both players say their math sentence out loud. The player with the greatest sum verbalizes, "seven is a greater sum than five".

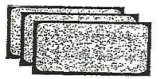
Player One [2|3] "7 is greater than 5" Player Two [4|1]

In the event of a tie (both players have equal sums):
This is the traditional rule for ties in WAR. Players will do the following:

Tie dominoes remain face up. The Tie Break Round begins with both players drawing three ... more dominoes keeping them face down. Each player draws one more domino and flips it ove The player with the greatest sum verbalizes "6 is greater than 4" and all ten dominoes (the two original ones, six face down ones and the two tie breaker dominoes) are put into the winner's poir pile.

EXAMPLE:

Player One [3|2] 5 + 3 = 8 TIE Player Two [4|4] 4 + 4 = 8



[5|1] "6 is greater than 4" [3|3]

VARIATIONS:

SUBTRACTION WAR: Players draw a domino and subtract the pips. The player with the least difference captures the dominoes. "One is a smaller difference than two" and Player One wins

Player One [6|5] 6 - 5 = 1 Player Two [2|0] 2 - 0 = 2

MULTIPLICATION WAR: Players draw a domino and multiply the pips. The player with th greatest product captures the dominoes. "Twenty is a greater product than six" and Player One wins

Player One [5|4] 5 x 4 = 20 Player Two [3|2] 3 x 2 = 6

"When a flower doesn't bloom, you fix the environment in which it grows, not the flower."

~Alexander Den Heijer

CLIMATE

IF AT FIRST YOU DON'T SUCCEED, TRY TRY AGAIN

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