

NOTTINGAM WEST ELEMENTARY SCHOOL

Everyday Mathematics Parent Handbook

Games Used in Everyday Mathematics

(Developed by Ann Arbor Michigan Curriculum & Instruction Department)

Many parents and educators make a sharp distinction between work and play. They tend to “allow” play only during prescribed times as a way of keeping children out of mischief or of working off their excess energy. But children’s natural tendencies are to carry their playfulness into all their activities. This is why Everyday Mathematics sees games as enjoyable ways of practicing certain number skills, especially ones that help children develop good fact power. Games can be played over and over without repeating the same problems because the numbers in most games are generated randomly.

We encourage you to help your child practice math by playing these games with your student at home. The numbers in parentheses after each game title indicate the appropriate grade range for the game.

If your child needs or wants to practice an area of math not addressed by the games we have shown here, talk to your child’s teacher, who can suggest other appropriate games or home exercises.

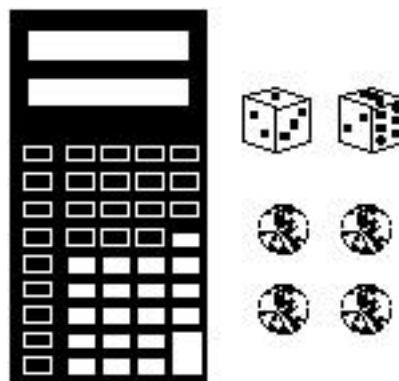
Competition

It is true that many of the games in the Everyday Mathematics program are competitive. Fair competition can generate many good things: excitement, determination, independence, and challenge. But Everyday Mathematics also promotes the idea that game rules may be changed to fit the players’ needs for fairness, harmony, and equality. Thus, it is possible to modify most of the games so that children practice the same number skills, but work cooperatively. The challenge and excitement will come from the process: working together, making some joint decisions, doing one’s best, having fun

Game Materials

Many games involve generating numbers randomly to inject both an element of chance and a sense of fairness. Several tools for helping children get random numbers are listed below.

Calculators: Some calculators have a key that generates a random number. Usually it is labeled [RND] or [RAND]. How the key works varies



from one machine to the next. See the user's guide for your calculator

Dice: Use a regular die to generate numbers up to 6. Use a pair of dice to generate numbers up to 12. A polyhedral die can be used to extend the range of numbers beyond 12.

Egg cartons: Label each cup with a number. For example, you might label the cups 0 - 11. Place one or more pennies or other small objects inside the carton, close the lid, shake the carton and then open the carton to see in which cups the objects landed.

Spinners: Spinners are used throughout Everyday Mathematics.

Standard playing cards: Use the 2 - 10 cards to represent these numbers and aces to represent the number 1. Write the number 0 on the queens' face cards, the numbers 11 through 18 on the remaining face cards (kings, jacks), and 19 and 20 on the jokers.

The Everyday Math Deck: This deck of cards consists of four sets of number cards 0 - 10, and one set of number cards 11 - 20. It also has fractions. You can limit the range of numbers to be generated by removing some of the cards from the deck. This is used in many of the grade 1 - 4 classrooms. To get random numbers, shuffle the deck and draw cards. Everyday Math decks can be purchased through your school or you can make your own set of number cards.

Number Cards: Number cards are used in many of the Everyday Mathematics games. Families can purchase decks or create their own using blank index cards.

Directions: Have the children make a special deck of playing cards, using blank index cards and markers. The deck will contain 40 cards, 4 each of numbers 1 - 10. Let the children write the numbers and, if they wish, add the appropriate number of small drawings (flowers, X's, smiley faces) to the face of the cards. (The backs, of course, should remain blank.)

Variation: **The 40-card deck may be reduced to 20 or 30, depending upon the numbers of players and their ability.**

Baseball Multiplication (3 – 5)

Beginners' Game:

Materials: 2 regular dice, 4 pennies, a Multiplication Facts Table or a calculator

Number of players: 2

Directions: Take turns being the “pitcher” and the “batter.”

1. At the start of the inning, the batter puts a penny on home plate.

2. The pitcher rolls the two dice. The batter multiplies the two numbers that come up and tells the answer. The pitcher can check the answer in a multiplication table or on a calculator.

3. The batter looks up the product in the Hitting Table. If it is a hit, the batter moves all pennies on base as follows:

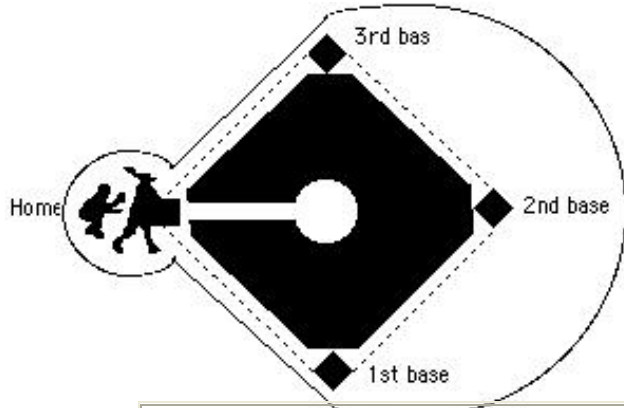
Single 1 base
Double 2 bases
Triple 3 bases
Home Run 4 bases or across home plate

4. A run is scored each time a penny crosses home plate. If a play is not a hit, it is an out.

5. A player remains the batter for 3 outs. Then players switch roles. The inning is over when both players have made 3 outs.

6. After making the third out, a batter records the number of runs scored in that inning on the scoreboard.

7. The player who has more runs at the end of 4 innings wins the game. If the game is tied at the end of 4 innings, play continues into extra innings until one player wins.



Hitting Table	
1 to 6 Facts	
1 to 9	Out
10 to 19	Single (1 base)
20 to 29	Double (2 bases)
30 to 35	Triple (3 bases)
36	Home Run (4 bases)

8. If, at the end of the first half of the last inning, the second player is ahead, there is no need to play the second half of the inning. The player who is ahead wins.

9. Make your own scoreboard like the one below, on a separate sheet of paper.

SCOREBOARD							Extra Innings			
Inning		1	2	3	4	5	6	7	Final Score	
Team:	Outs									
	Runs									
Team:	Outs									
	Runs									

SCOREBOARD							Extra Innings			
Inning		1	2	3	4	5	6	7	Final Score	
Team:	Outs								5	
	Runs	1	0	2	1	1				
Team:	Outs								4	
	Runs	0	3	1	0	0				

1 to 10 Facts Game

Use a number card deck with 4 each of the numbers 1 to 10 instead of dice, At each turn, draw 2 cards from the deck and find the product of the numbers. Use the 1 to 10 Facts Hitting Table to find out how to move the pennies.

Hitting Tables		
1 to 6 Facts	1 to 10 Facts	1 to 12 Facts
1 to 9 Out 10 to 19 Single (1 base) 20 to 29 Double (2 bases) 30 to 35 Triple (3 bases) 36 Home Run (4 bases)	1 to 21 Out 22 to 45 Single (1 base) 46 to 70 Double (2 bases) 71 to 89 Triple (3 bases) 90 to 100 Home Run (4 bases)	1 to 24 Out 25 to 49 Single (1 base) 50 to 64 Double (2 bases) 65 to 79 Triple (3 bases) 80-144 Home Run (4 bases)

1 to 12 Facts Game

At each turn, roll 4 regular dice. Separate them into 2 pairs. Add the numbers in each pair and multiply the sums.

Example Suppose you roll a 1, 3, 5, and 6. You could separate them as follows:

$$1 + 3 = 4$$

$$1 + 5 = 6$$

$$1 + 6 = 7$$

$$5 + 6 = 11$$

$$3 + 6 = 9$$

$$3 + 5 = 8$$

$$4 * 11 = 44$$

$$6 * 9 = 54$$

$$7 * 8 = 56$$

How you pair the numbers can make a difference in the kind of hit or out.

World Series

Choose 2 teams of players as in real baseball. Make up a batting order. The first team to win 4 games wins the World Series.

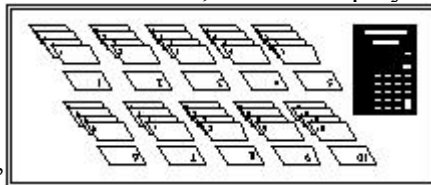
For a shorter series, play the best 3 out of 5 games.

Beat the Calculator (Addition Facts) (1 – 5)

Materials: Number cards – 40 cards (4 each of numbers 1 – 10)

Number of players: 3

Directions: One player is the “caller,” a second player is the “calculator,” and the third



player is the “brain.”

1. Shuffle the deck of cards and place it face down on the playing surface.
2. The caller turns over the top two cards from the deck. These are the numbers to be added. The calculator finds the sum with a calculator, while the brain solves it without a calculator. The caller decides who got the answer first. Players trade roles every 10 turns or so.

Variation 1 - Beat the Calculator (Multiplication Facts): Players multiply the numbers on the two cards.

Variation 2 - Beat the Calculator (Extended Multiplication Facts): The caller attaches a 0 to either one of the factors or both factors.

If the caller turns over a 4 and a 6, he/she may make up one of the following problems:

Example

$$4 * 60$$

$$40 * 6$$

$$40 * 60$$

Broken Calculator (1 – 5)

Materials: calculators

Number of players: 2

Directions: Partners pretend that one of the number keys on the calculator is broken. One partner says a number, and the other tries to display it on the calculator without using the “broken” key.

Keeping Score: an extended challenge (optional): A player’s score is the number of keys entered to obtain the goal. Scores for five rounds are totaled, and the player with the lowest total wins.

Example: If the 8 key is “broken,” a player can display the number 18 by pressing 9 [+] 7 [+] 2 (score 5 points); 9 [x] 2 (score 3 points); or 72 [÷] 4 (score 4 points).

Concentration (K)

Materials: Number Cards; markers

Directions: Use 20 or 40 cards. Place the cards face down in rows of 4 or 8. The first player turns over 2 cards. If the cards make a pair, the player keeps them. If not, they are turned face down again. The next player takes a turn, then the next, and so on. Players try to remember the position of cards so that they can match pairs. When all the cards are matched, the player with the most cards wins. Encourage children to say the number on each card as they turn them over.

Disappearing Train (K)

Materials: blank die; cubes or other small objects

Directions: Mark the sides of a die with -1, -2, -3, -1, -2, -3. Explain that the die has minus signs before each number because this sign means “subtract” or “minus.” Children play the game in small groups or pairs. Begin by having each child make a train of cubes (or blocks, bottle caps, buttons, etc.) equal in number. They take turns rolling the die and removing as many cars from their trains as the numbers on the die indicate. The

child whose train is the first to disappear wins. Players must roll the exact number needed to make the train disappear. If one cube is left, player needs to roll a -1 to finish.

Go Fish (K)

Materials: Number Cards - 40 cards, 4 each of numbers 1 - 10

Directions: Use 1 set of 10 number cards for each player. Mix up the cards. Each player receives 5 cards. The other cards are stacked in a pile, face down. Each player checks for pairs and lays any down. Then play begins. On each turn, a player asks the child on his or her right for a card needed to make a pair. If the second player has it, he or she must give it up, and the first player tries again. However, if the second player does not have the card asked for, he or she says, "Go Fish," and the first player picks a card from the pile. If it is what was asked for, the first player goes again. Otherwise it is the next player's turn. Pairs are laid down as they are made. The first player with all cards paired wins.

Making Change Game (2 – 4)

Materials: 2 dice; one \$1 bill, 6 quarters, 2 dimes and 2 nickels for each player

Number of players: 2 or 3

Directions: There is no money in the bank at the beginning of the game. Players take turns depositing money into the bank. To determine the amount they are to deposit, they roll the dice and multiply the total number of dots on the dice by 5 cents. At the beginning of the game, they will be able to count out the exact amounts. Later, they make change from the money in the bank if they don't have the exact amounts. The first player without enough money to put in the bank wins.

Variations: 1) Use two different-colored dice to represent nickels and dimes. Each player starts with three \$1 bills in addition to the coins. 2) Use three different-colored dice to represent nickels, dimes, and quarters. Each player starts with six \$1 bills and one \$10 bill in addition to the coins.

Money Exchange Games (2 – 4)

Materials: Play money: twelve \$1 bills, twelve \$10 bills, and one \$100 bill for each player; a Place-Value Mat (see sample) for each player; 2 regular dice

Number of players: 2 or 3

One Hundred Dollars \$100	Ten Dollars \$10	One Dollar \$1



Directions for Collection Game: Players put all their money in the bank. At each turn, they roll the dice, take from the bank the amount they roll, and place the money on the game mat. Whenever possible, they trade ten \$1 bills for a \$10 bill or ten \$10 bills for a \$100 bill. The first player to trade for a \$100 bill wins. Most games last 12 - 18 rounds.

Directions for Take-Apart Game: Each player begins with a \$100 bill; the rest of the money goes into the bank. At each turn, players roll the dice and put the amount they roll into the bank. They exchange a bill of a higher denomination for bills of the next-lower denomination, as needed. The first player with less than \$12 wins.

Variations:

- 1) Set larger or smaller goals.
- 2) Generate larger numbers, which shorten the number of rounds to reach a given goal, using polyhedral dice or 3 dice.
- 3) Use dollar bills, dimes, and pennies instead of \$100, \$10, and \$1 bills.

Name That Number (2 – 5)

Materials: Make up a deck of number cards from an ordinary deck of playing cards, as follows:

- For the numbers 2 through 10, use the 2 through 10 cards.
- For the number 1, use aces.
- Write the number 0 on the queens' face cards.
- Write the numbers 11 through 18 on the remaining face cards (kings, jacks).

Number of players: 2 or 3

Directions: Shuffle the deck of cards and deal 5 cards to each player. Turn over the top card. This is the target number for the round. Players try to name the target number by adding, subtracting, multiplying, or dividing the numbers on as many of their cards as possible. A card can only be used once. They write their solutions on a sheet of paper or slate. Then they set aside the cards they used to name the target number and replace them with new cards from the top of the deck. They put the target number on the bottom of the deck and turn over the top card. This is the new target number. Play continues until there are not enough cards left in the deck to replace both players' cards. The player who sets aside more cards wins the game.

Sample turn:

Players' numbers: 7, 5, 8, 2, 10; Target number: 16

Some possible solutions (cards used are in bold):

$$7 \times 2 = 14 \rightarrow 14 + 10 = 24$$

$$\rightarrow 24 - 8 = 16$$

(four cards used)

$$8 \div 2 = 4 \rightarrow 4 + 10 = 14$$

$$\rightarrow 14 + 7 = 21$$

$$\rightarrow 21 - 5 = 16$$

(all five cards used)

Odd One Out (K)

Materials: Number Cards - 40 cards, 4 each of numbers 1 - 10

Directions: Mix up a deck of number cards and one card with a unique drawing on it. Allow one set of ten cards for each player. The unduplicated card with the drawing on it is the “odd one out.” Deal out all the cards. Players look at their hands and put aside any pairs. The first player then draws a card from the person on the right. Pairs are put to one side. The next player (to the left of the first player) then gets to pick a card from the person on his right, and so on. The game ends when one player puts down all his or her cards. The player who has the “odd” card at the end of the game is the “odd one out.”

Interesting Fact: Adults may remember “Old Maid” as a similar game.

Pick-a-Coin (2 – 3)

Materials: a regular die, recording sheet & a calculator for each player

Number of players: 2 - 4

Directions: (Note: on the recording sheet, P = pennies, N = nickels, D = dimes, Q = quarters.)

Players take turns. At each turn, a player rolls a die five times. After each roll, the player can elect to put his number in any of the open cells by choosing whether to mark this roll as P, N, D, Q or \$1, recording the number rolled in the appropriate space and repeating until all five cells are filled. At the end of the five rolls the player calculates the amount of money the five rolls and choices yield. (It is OK to use a calculator.)

After four turns each, players compute their grand total. Highest total wins.

Sample Recording Sheet:

Player 1	P	N	D	Q	\$1	Total
1st Turn	2	1	4	5	3	\$ 4.72
2nd Turn						\$
3rd Turn						\$
4th Turn						\$
Total						\$

The “first turn” shown above is calculated as 2 pennies + 1 nickel + 4 dimes + 5 quarters + 3 dollars or $\$0.02 + 0.05 + 0.04 + 1.25 + 3.00 + \4.72 .

Top-It Games

Number Top-It (K)

Materials: Number Cards - 40 cards, 4 each of numbers 1 – 10

Number of players: 2

Directions: This is a game for two people. Deal out a deck of number cards to the two players. The players place their stack face down before them and turn over their top card. Each player reads aloud the number on the card. Whoever turned over the larger number keeps both cards. If the cards match, they are put aside and the next card is turned over. The player with the highest card takes both the tie cards and the new pair. When all the cards are used up, the player with the most cards wins.

Interesting Fact: Adults may remember this as the game “War.”

Addition Top-It (1 – 3)

Materials: Modified Standard Cards: 50 cards — 4 each of numbers 1 - 10 and 1 each of numbers

11 - 20

Number of players: 2 or 3

Basic Game: 40 cards, 4 each of numbers 1 - 10

Directions: A player shuffles the cards and places the deck number-side down on the playing surface. Each player turns over two cards and calls out their sum. The player with the largest sum wins the round and takes all the cards. In case of a tie for the largest sum, each tied player turns over two more cards and calls out their sum. The player with the largest sum takes all the cards from both plays. Play ends when not enough cards are left in the deck for each player to have another turn. The player with the most cards in his/her pile wins. Or players may toss a penny to determine whether the player with the most or the fewest cards wins.

Variations:

- 1) Use the 11 – 20 cards in addition to the 1 – 10 sets.
- 2) Use a set of double-nine dominoes instead of a set of number cards. Place the dominoes face down on the playing surface. Each player turns over a domino and calls out the sum of the dots on the two halves. The winner of a round takes all the dominoes in play.
- 3) Use a regular die and a polyhedral die. Place 20 pennies or counters in a pile. The winner of a round takes a penny or counter from the pile.
- 4) To practice addition with three addends, use three cards or three dice, possibly a combination of regular and polyhedral dice.

Subtraction Top-it (1 – 3)

Materials: Number Cards: 4 each of the numbers 1 - 10, 1 each 11 - 20 or two polyhedral dice

Number of players: 2 or 3

Directions: The game is played the same way as Addition Top-It. Use the cards or dice to generate subtraction problems. The player with the largest difference wins the round. The game ends when there are no more cards to be turned up or when time runs out.

Multiplication Top-it (3 – 5)

Materials: Number Cards: 4 each of the numbers 0 - 10

Number of players: 2 - 4

Directions: One player shuffles the cards and places the deck number-side down on the playing surface. In a round, each player turns over two cards and calls out the product. The player with the largest product wins the round and takes all the cards. In case of a tie for the largest product, each tied player turns over two more cards and calls out the product. The player with the highest product takes all the cards from both plays. Play ends when not enough cards are left for each player to have another turn. The player with the most cards wins. Or players may toss a penny to determine whether the player with the most or the fewest cards wins.

Subtraction Pole Vault (4 – 5)

Materials: 1 set of number cards: 4 cards for each of the numbers 0 through 9; scratch paper to record results; a calculator to check answers

Number of players: 1 or more (You may play by yourself or with other players.)

Directions: Shuffle the cards and place the deck face down on the playing surface. Each player starts at 250. They take turns doing the following:

1. Turn over the top 2 cards and make a 2-digit number. (There are 2 possible numbers.) Subtract this number from 250 on scratch paper. Check the answer on a calculator.
2. Turn over the next 2 cards and make another 2-digit number. Subtract it

from the result in step 1. Check the answer on a calculator.

3. Do this 3 more times: Take 2 cards, make a 2-digit number, subtract it from the last result, and check the answer on a calculator.

The object is to get as close to 0 as possible, without going below 0. The closer to 0, the higher the pole-vault jump. If a result is below 0, the player knocks off the bar, the jump does not count.

Sample Jump

Turn 1: Draw 4 and 5 Subtract 45 or 54 250-45=205	Turn 3: Draw 4 and 1 Subtract 41 or 14 145-41=104	Turn 5: Draw 6 and 9 Subtract 69 or 96 81-69=12
Turn 2: Draw 0 and 6 Subtract 6 or 60 205-60=145	Turn 4: Draw 3 and 2 Subtract 32 or 23 104-23=81	

Two-Fisted Pennies Game (1 – 2)

Materials: 10 pennies per player

Directions: Players count out 10 pennies, then split them between their two hands. (Help children identify their left and right hands.) Players share their amounts. For example: my left hand has 1 and my right hand has 9; left hand 3 and right hand 7; left hand 4 and right hand 6; left hand 5 and right hand 5. The various splits for any given number can be recorded on paper. Partners can continue to play using a different total number of pennies; for example, 9, 12, 20.

Variations: 1) Partners take turns grabbing a part of a pile of 20 pennies. The other partner takes the remainder of the pile. Both players count their pennies, secretly. The partner making the grab uses the count to say how many pennies must be in the partner's hand. (I have 12, you must have 8.) The eventual result is many addition names for 20. Change the number of pennies in the pile to practice addition names for other numbers. 2) Two-Fisted Dimes Game – played the same way as Two-Fisted Pennies Game, using dimes.