Math Games
For Skills and Concepts

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Table of Contents

Why use games to practice skills?

1) They are more engaging.
2) They provide more practice. Consider the product game: for each move you are considering multiple multiplication problems.
3) They are a constructive reward for use in free time in your class, in addition to whole class use.
4) They are more likely to involve parents and other family members with homework. Be sure to send home the instructions or rules. Or consider hosting a night where parents can come to play with the kids. Or pull them out at parent-teacher conferences.
5) They can be really fun. (Duh!)

Where can you find more?

1) Best source: exemplary curricula.
    o For elementary, Investigations in Number, Data, and Space (which even includes computer games) and Everyday Math.
    o For middle school, Connected Math Project and MathScape (among others).
    If you are lucky enough to be in a school using these curricula, use the games! If not, you can find copies available from your district math curriculum supervisor, from university libraries (the KCRC at GVSU), or order them yourself from amazon.com.
    o The internet, but be careful! There are a lot of useless games out there.
2) Make your own. Once you get the idea for what skill practice your students need, think of a way from them to generate problems. This will often lead to a game structure. Or, once you are familiar with other constructive games, adapt those to your purpose.
3) Sharing with your colleagues. In your school, from your college, at math meetings… don't be shy. If you write one up that you'd like to share via internet, I'd be happy to post it. If it's original, be sure to include a copyright with permission granted for educational use. If it's from another source, or closely adapted from another source, please cite that source.

How do you evaluate games?

1) Examine mathematical richness. If the game is just window dressing for drill and kill (like math bingo) evaluate it deservingly. Look for problem solving, need for strategy, and math content required.
2) Is speed required? The best games offer equal opportunity (or nearly so) to all your students. Games that require computational speed to be successful will disenfranchise instead of engage your students who need the game the most.
3) Do you find the game interesting or fun? Then your students probably will also.
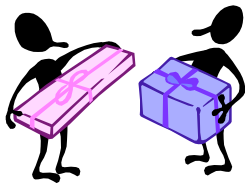
Give Away
It's better to give than to receive!

Players: 2 to as many as you can stand.

Rules: All players start with five blocks (coins, beads, etc.) For one player they should all be the same, but different from the other players. The goal is to give all your pieces away.

Turn: Player says how many pieces they have. Then they roll a die. Players give away as many as they rolled – except on a 6 they give away nothing. Choose one other player you are going to give your blocks to. The first player to give all their pieces away wins!

Questions: Good questions to ask include "How many will you have left? How many will I have? If you have 4, how many have you given away? I can give back 4 blue, how many red do I need to put in?" Work on counting on and subitizing. Subitizing is recognizing an amount by looking – for example, asking: "Can you tell how many blue beads you have just by looking?" Try arranging the pieces in common patterns, such as on dice or dominoes. For counting on, if the player knows how many of one color (like 3) count on the others (4, 5, 6, …) instead of counting them all from 1. Ask about strategy and try to get players to think about giving to those with least.
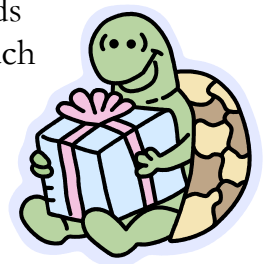
Take Away
Mine! Mine! Mine!

Players: 2 to as many as you can stand.

Rules: All players start with five blocks (coins, beads, etc.) For one player they should all be the same, but different from the other players. The goal is to get to at least ten pieces. When one player is out, others can keep playing or the game can stop.

Turn: A player begins by announcing how many pieces they have. They roll a die, and then take that many pieces from the player with the most. Except on a six you take nothing. If two or more players are tied for the most, you can choose from whom to take. At the end of your turn, announce how many you have now.

Questions: Work on counting on, 5 + facts and sums to ten. Also good for comparison: who has more, how many more, etc.

Tens Go Fish

From **Number Games and Story Problems: Addition and Subtraction**
Investigations in Number, Data, and Space

What Happens
In the game Tens Go Fish, students make combinations of ten with two addends.

Introducing Tens Go Fish
If your students are familiar with the card game Go Fish, they will need just a brief introduction to Tens Go Fish.

First explain about "making 10" with pairs of Number Cards. Draw five Number Cards in a row on the board or on chart paper. Include one pair that makes 10. For example, you might select the cards 4, 1, 5, 7, and 9.

> I'm going to show you a game called Tens Go Fish. The object is to find pairs of cards that add up to 10. Each player gets five cards to start. Let's say these cards are the cards in my hand: 4, 1, 5, 7, and 9. Can I make 10 with two of these cards? ...OK, I could make 10 with the 1 and the 9. That's my first pair.

Redraw the 1 and 9 cards, as a pair, to one side.

> If I look at my hand when the game starts, and I have a pair that make 10, I can take them out and then draw two more cards.

Replace the cards you have put down with two more cards; this time making sure that no pairs of cards in your hand make 10. For example, if you have 4, 5, and 7, you might add another 4 and a 2.

> Let's say I drew a 4 and a 2, so now these are my cards: 4, 2, 4, 5, and 7. Do any two of these cards make 10?

> When it's my turn, I can ask the other player for a certain card that I need to make a total of 10. For example, suppose I wanted to make 10 using the 2 in my hand. What card would I need to add to the 2 to make 10?

> So, if I was playing with Claire, I might ask, "Claire, do you have an 8!" If Claire has an 8, she gives it to me. I put the 8 and the 2 down as a pair, and draw the top card from the deck. If Claire does not have an 8, she says "Go Fish." I take a card from the top of the deck.

> Each time I draw a new card, I check to see if I can make 10 with that card and one already in my hand. If I can, I put the pair aside and draw a new card. If I can't, my turn is over.

Start a demonstration game with a student volunteer. Explain that for this game, you will be showing students your cards so that they can learn how to play. When students play in pairs, they will not show their cards to their partners. As you play, involve students in your turn.

> I have a 5, 7, 2, 1, and 4. Can I use two of these cards to make 10? No one sees away? OK, so what could I do next?

You might decide to play an entire demonstration game, or if you think most students understand how to play, just play for a few turns. In this case, explain that the game continues with each player trying to make combinations of 10. The game is over when there are no more cards.

If you never have a 10 and a 0 card in one hand during the demonstration game, find these cards and be sure students recognize that they can make a pair with 10 and 0.

As you collect pairs that make 10, put each one in a separate pile. Explain that this is so the cards don't get mixed up, because at the end of the game, players turn over their pairs and list all the combinations of 10 they made, using addition notation. Model this for your students.

Rules: Tens Go Fish

Materials: Number Cards with wild cards removed (1 deck per pair); card holders (optional); unlined paper; counters (available)

Students play in pairs or threes. Each player is dealt five cards. (Use card holders, made as described on p. 101, if the numbers show through to the back of your cards.) Players take turns asking each other for cards that will make 10 with a card already in their hand. They place any pairs made on the table and draw a new card from the deck at the end of each turn. If a card drawn from the deck makes a pair with a card in the hand, the player puts that pair down and draws again.

If a player uses up all his or her cards and there are still cards left in the deck, that player draws two cards. The game is over when there are no more cards in the deck. At the end of the game, players list the combinations of 10 they made.

For more challenge, students can play the game in groups of three or four; with more players, it is more difficult to remember the cards other players have asked for.

Observing the Students: Tens Go Fish

How do students decide which card to ask for? Do they use knowledge or combinations of 10? Do they use counting strategies to find a number that goes with a card in their hand to make 10? Do they seem to ask for cards at random?

Are students able to keep track of the cards other players have asked for? Do they use this to reason about what cards the other player has?

Some pairs might benefit from playing cooperatively. After a player chooses one card to use to make 10, both players figure out together which other card is needed to finish the pair. If the other player does not have this card, the pair can look for another way to make 10, using one card from each hand.

Variations
- o   Different cards will work on different skills.
- o   Vary the target sum for other fact practice.
- o   Allow more than 2 cards for a sum to ten.
- o   Play rummy style where you keep cards in your hand until you can lay them all down
- o   Keep score by counting up points on the table subtracting points in hand.

	1		10	
C	2		9	P
O	3	**COVER UP**	8	U
V	4		7	R
E	5		6	E
R	6		5	V
–	7		4	O
U	8		3	C
P	9		2	–
	10		1	

COVER UP

Materials:
20 chips, two dice, and the cover up board.

Game:
(1) Line the chips up over the rows with the letters.
(2) Roll two dice. Cover up one or more numbers that add up to the total rolled. For example if you roll a total of 6, you could cover 6, or 5 and 1 or 1, 2 and 3.
(3) You might not always have a move – if you can't cover –up the total roll, you can't cover up any.
(4) First player to cover all their numbers wins.

Cover-Up is from the Cuisenaire Teacher Resource Materials. © ETA Cuisenaire

The Sums Game

10	2	3	4	5
8	6	12	10	7
9	11	14	18	13
12	16	10	17	15
6	9	5	7	10

1	2	3	4	5	6	7	8	9
1	2	3	4	5	6	7	8	9

Play begins with each player covering a number from 1 to 9 at the bottom. The 2nd player then covers the sum of those two numbers on the game board. The 1st player can then select one new number from 1 to 9 at the bottom and cover the sum of those two numbers. Play continues until one player has covered four squares in a row, horizontally, vertically, or diagonally.

(Adaptation of the Product Game)

Ten Frame Fill Up

Ten Frame Fill Up

2-4 players

Materials:

Content: counting up, subitizing, sums to five, sums to ten.

- One die or one per player
- Ten frames board
- 10 Blocks for each frame in play
- Scoring chips (number depends on length of game)

Set Up: Place a scoring chip on the tenth spot in each frame.

Rules: players roll dice to see who goes first. (Highest untied die roll goes first.) Player rolls a die, and adds that many blocks to any ten-frame – only one frame at a time. The other player rolls and does the same. If adding blocks to a ten frame would make more than 10, you can not do it. If no ten frame has room for your roll, you can't place any blocks and it's the next players turn. If you fill up a ten frame exactly, take the scoring chip and remove all blocks and place a new scoring chip on the tenth spot. Play goes for a set amount of time. Player with most scoring chips wins.

Variations: 1) scoring chips can go on other places than tenth. Player who removes the first scoring chip chooses where the next one goes. 2) If 4 ten frames are too many, just play on 2 frames.

Questions: Be sure to ask how many in a frame, how manymore to fill it, what determines a good move, how they made decisions, etc.

Five In a Row

Players: 2 and up

Materials: 1 Gameboard per player, counters, Number cards (1 to 10 only), chips to cover spaces.

Goal: Cover 5 spaces in a row, vertically or horizontally or diagonally.

Gameplay: Shuffle the number cards and put in a face down pile. On each turn, put the top three cards face up. Each player can cover up any number which is the sum of any two of the revealed cards. For example, 3, 4 and 9 would mean you can cover 7, 12 and 13. Since each child has a different gameboard, this prevents just copying the spaces covered.
Questions: Which cards do you need turned up to cover ___ or to finish a row? If a 4 is turned up, what other numbers would you like to see turn up?

Variations:
1) Turn up five cards, cover any combination of 2. (There's up to10 possible combinations!) Or do this and allow students to cover only 3 of the combinations they see.
2) Have students work cooperatively on the same board. Or have students make their own boards.

Game Boards are 5 by 5 grids, with numbers from 2 to 20 distributed randomly. Use multiple 10s or other sums of interest, and few low numbers. Kids can make up their own boards.

Five In a Row -- Game Boards

2	4	6	8	10
10	10	12	12	14
16	18	20	19	17
15	13	11	11	11
9	9	7	5	3

20	18	16	14	12
12	10	10	10	8
6	4	2	3	5
7	9	9	11	11
13	15	15	17	19

2	3	4	5	6
7	8	9	9	10
10	10	11	11	12
12	12	13	14	15
16	17	18	19	20

Race to 100

Game for two players or teams.

Materials: Rolling mat, score sheet, 1 die, abacus (or hundreds chart or base ten blocks…)

How to Play: roll the die to see who goes first. That player rolls the die onto the rolling sheet. Your hand has to start from *not* above the sheet. You score whatever you roll if the die is outside of the grey rectangle or off the sheet. You score your roll +10 if the die is on the grey rectangle – even if only a little bit is on. If the die is totally within the white oval, you score your roll +20. Keep track of your total score by moving the beads on the abacus. (Or using whatever your method is for keeping score.)   The first player to pass 100 wins. If playing again, the winner goes second and the other player goes first. Optional: record score on paper also.

Variations: (1) rolls off the mat are subtracted from the total. (2) Start at 100, and subtract the scores to race to zero.

Score: 3

Score: 13

Score: 23

One	Two

One	Two

One	Two

Roll+10

Roll+20

Roll+10