



Making math interactive and fun with card games

Card games are a great way to combine math and fun! At the earliest stages of math education, cards can be used to practice number recognition. The common game of War then goes a step further and requires students to know which of two values is greater. Are there any fun card games that would challenge middle school students? Absolutely! We have included a few card games in this club activity, and there are many more online. Break out a few decks of cards (including the two decks provided in your MATHCOUNTS Club in a Box), and watch your students have a great time while practicing their computation skills and learning some number theory, too!

MATERIALS NEEDED

- Standard decks of cards—1 per 3 club members (provided in the Club in a Box)
- Lightning War Playing Mat (provided in the Club in a Box)*
- Complete Guide to Card Game Rules (on back of Lightning War Playing Mat provided in the Club in a Box)*
- Make 100 Score Sheet*
- Stopwatches (optional)

* Included in this *Club Activity Book* and available for download at www.mathcounts.org/ClubLeaders

GAME 1: LIGHTNING WAR

Participants: 3 students (2 players + 1 referee)

Skills practiced: Mental math and computation

Materials: 1 standard deck of cards, 1 Lightning War Playing Mat

Setup:

1. Separate the face cards and aces (J, Q, K, A) from the rest of the deck. These are the referee's (ref's) 16 cards. They will represent the 4 operators (J/+; Q/- ; K/× ; A/÷).
2. The ref deals the other 36 playing cards to the 2 players. Each player receives 16 cards. The remaining 4 cards are set aside and not used.
3. Each player and the ref hold their pile of cards such that they are face down and the values of the cards cannot be seen by anyone.
4. The Lightning War Playing Mat is placed so the players can see the expression that will be formed.
5. For this game, red numbers (2-10) are negative values and black numbers (2-10) are positive values.
6. For division problems, non-integer answers must be given as a mixed number when greater than 1 and as a common fraction when less than 1. See the example provided on the Playing Mat.

LIGHTNING WAR

Participants: 3 students (2 players + 1 referee)
Setup and rules:

1. Separate the face cards and aces (J, Q, K, A) from the rest of the deck. These are the referee's (ref's) 16 cards. They will represent the 4 operators (J/+; Q/- ; K/× ; A/÷).
2. The ref deals the other 36 playing cards to the 2 players. Each player receives 16 cards. The remaining 4 cards are set aside and not used.
3. Each player and the ref hold their pile of cards such that they are face down and the values of the cards cannot be seen by anyone.
4. The Lightning War Playing Mat is placed so the players can see the expression that will be formed.
5. For this game, red numbers (2-10) are negative values and black numbers (2-10) are positive values.
6. For division problems, non-integer answers must be given as a mixed number when greater than 1 and as a common fraction when less than 1. See example at right.

How to play:

1. The ref calls "Flip" and the players and ref will each take the top card from their own pile and place it face up in the corresponding location on the Lightning War Playing Mat.
2. The first player to yell the correct value of the expression gets to keep all 3 cards. (These should be set aside in each player's "winnings" pile.) Each player may answer only once per round. The first value yelled by a player is her final answer. **The ref has the final say as to which player wins the round.**
3. This is the end of round 1. Each round follows steps 1 and 2.
4. After completing 16 rounds (when everyone is out of cards), the player with more cards in her winnings pile is the winner.
5. If there is a tie, the ref will set out one final expression, and the first player to yell out the correct value is the winner.

J/+ Q/- K/× A/÷

red/neg black/pos

6♣ A♦ 8♦

red/neg black/pos

6♣ A♦ 8♦ = 6 ÷ -8 =

-3/4

red/neg black/pos

player #1's card

referee's operator card

red/neg black/pos

player #2's card

=

How to play:

1. The ref calls "Flip" and the players and ref will each take the top card from their own pile and place it face up in the corresponding location on the Lightning War Playing Mat.
2. The first player to yell the correct value of the expression gets to keep all 3 cards. (These should be set aside in each player's "winnings" pile.) Each player may answer only once per round. The first value yelled by a player is her final answer. **The ref has the final say as to which player wins the round.**
3. This is the end of round 1. Each round follows steps 1 and 2.
4. After completing 16 rounds (when everyone is out of cards), the player with more cards in her winnings pile is the winner.
5. If there is a tie, the ref will set out one final expression, and the first player to yell out the correct value is the winner.

The complete instructions for setting up and playing *Salute*, *Multi-Digit War* and *Make 100* can be found on the back of the Lightning War Playing Mat (included in the MATHCOUNTS Club in a Box) and at www.mathcounts.org/ClubLeaders.

GAME 2: SALUTE (abbreviated instructions)

Participants: 3 students (2 players + 1 referee)

Skills practiced: Inferential thinking, algebra, mental math and computation

Materials: 1 standard deck of cards

Game summary: Red cards (1-10) have negative values. Black cards (1-10) have positive values. Each player places a card on her forehead, and can only see the opponent's card. The players race each other to guess their own card, based on the sum or product given by the referee.

<div style="border: 1px solid black; width: 60px; height: 60px; display: flex; align-items: center; justify-content: center; margin: 5px;">?</div> <p>Mine</p>	<div style="border: 1px solid black; width: 60px; height: 60px; display: flex; align-items: center; justify-content: center; margin: 5px;">4 </div> <p>Opponent's</p>	<div style="border: 1px solid black; padding: 5px; margin: 5px;">Referee says: "Product is 36."</div>	$\begin{aligned} -4 \times ? &= 36 \\ -4 \times -9 &= 36 \\ \text{MINE IS } -9. \end{aligned}$	<div style="border: 1px solid black; width: 60px; height: 60px; display: flex; align-items: center; justify-content: center; margin: 5px;">?</div> <p>Mine</p>	<div style="border: 1px solid black; width: 60px; height: 60px; display: flex; align-items: center; justify-content: center; margin: 5px;">9 </div> <p>Opponent's</p>	<div style="border: 1px solid black; padding: 5px; margin: 5px;">Referee says: "Sum is 17."</div>	$\begin{aligned} 9 + ? &= 17 \\ 9 + 8 &= 17 \\ \text{MINE IS } 8. \end{aligned}$
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GAME 3: MULTI-DIGIT WAR (abbreviated instructions)

Participants: 3 students (2 players + 1 referee)

Skills practiced: Mental math and computation

Materials: 1 standard deck of cards, stopwatch

Game Summary: Players see 3 cards at one time and race each other to come up with the greatest product of the form $(__\) \times __$ in less than 30 seconds. This game easily can be made more challenging, or easier, depending on the ability level of your club members. Note: All values in the example are positive, but the rules can be changed so red cards represent negative values.

<div style="border: 1px solid black; width: 60px; height: 60px; display: flex; align-items: center; justify-content: center; margin: 5px;">4 </div>	<div style="border: 1px solid black; width: 60px; height: 60px; display: flex; align-items: center; justify-content: center; margin: 5px;">7 </div>	<div style="border: 1px solid black; width: 60px; height: 60px; display: flex; align-items: center; justify-content: center; margin: 5px;">5 </div>	$\begin{aligned} 47 \times 5 &= 235, & 45 \times 7 &= 315 \\ 74 \times 5 &= 370, & 75 \times 4 &= 300 \\ 57 \times 4 &= 228, & \mathbf{54 \times 7 = 378} \end{aligned}$ <p style="text-align: right;">378 GREATEST</p>
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GAME 4: MAKE 100 (abbreviated instructions)

Participants: 2-4 players

Skills practiced: Mental math and computation

Materials: 1 standard deck of cards (for 2 players), 2 standard decks of cards (for 3-4 players), stopwatch

Game Summary: Players choose 4 of their 6 cards to make a sum of two 2-digit numbers as close to 100 as possible in less than 30 seconds. The player to come up with the most sums closest to 100 after 6 rounds is the winner. Note: All card values are positive.

<div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 5px;">5 </div>	<div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 5px;">6 </div>	<div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 5px;">4 </div>	<div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 5px;">9 </div>	<div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 5px;">2 </div>	<div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 5px;">7 </div>
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With these 6 cards, a player could choose **5♥ 2♥** and **4♦ 7♠**, make **52 + 47 = 99**, and score **|99 - 100| = 1 point**. But can you find the better play to get to a score of 0?

LIGHTNING WAR

Participants: 3 students (2 players + 1 referee)

Setup and rules:

1. Separate the face cards and aces (J, Q, K, A) from the rest of the deck. These are the referee's (ref's) 16 cards. They will represent the 4 operators (J/+ , Q/- , K/x , A/+).
2. The ref deals the other 36 playing cards to the 2 players. Each player receives 16 cards. The remaining 4 cards are set aside and not used.
3. Each player and the ref hold their pile of cards such that they are face down and the values of the cards cannot be seen by anyone.
4. The Lightning War Playing Mat is placed so the players can see the expression that will be formed.
5. For this game, red numbers (2–10) are negative values and black numbers (2–10) are positive values.
6. For division problems, non-integer answers must be given as a mixed number when greater than 1 and as a common fraction when less than 1. See example at right.

red/neg **black/pos**

**player #1's
card**

J/+ Q/- K/x A/+

**referee's
operator
card**

How to play:

1. The ref calls "Flip" and the players and ref will each take the top card from their own pile and place it face up in the corresponding location on the Lightning War Playing Mat.
2. The first player to yell the correct value of the expression gets to keep all 3 cards. (These should be set aside in each player's "winnings" pile.) Each player may answer only once per round. The first value yelled by a player is her final answer. **The ref has the final say as to which player wins the round.**
3. This is the end of round 1. Each round follows steps 1 and 2.
4. After completing 16 rounds (when everyone is out of cards), the player with more cards in her winnings pile is the winner.
5. If there is a tie, the ref will set out one final expression, and the first player to yell out the correct value is the winner.

J/+ Q/- K/x A/+
red/neg black/pos



$$= 6 \div -8 =$$

-3/4

red/neg black/pos

**player #2's
card**



SALUTE

Participants: 3 students (2 players + 1 referee)

Materials: 1 standard deck of cards

Before you begin:

1. Remove all face cards from the deck.
2. Aces are treated as 1s.
3. Red numbers (1-10) are negative values. Black numbers (1-10) are positive values. So the 4♦ represents -4, and the 4♣ represents 4.
4. Decide if the referee will call out the sum or the product of the two numbers in each round.

Setup: The referee deals the 40 playing cards to both players such that each player receives 20 cards. The players hold their piles of cards such that they are face down and the numbers cannot be seen. The two players sit so that they are facing each other and the referee can see both of them.

How to play:

1. When the referee says "Salute," each of the two players simultaneously takes her top card and holds it on her forehead without being able to see the face of the card. Only the opponent and referee can see the card face.

2. The referee announces the sum (or product for a more advanced version) of the two cards.

3. Each player tries to be the first to announce the number on her own card (for example, "-3" or "6." Each player may make only 1 guess per round; her first guess is her final guess. **The referee determines the winner.**

4. The winner takes both cards. If there is no winner, the cards are set aside and nobody gets them. This is the end of round 1.

5. For the next 19 rounds, repeat steps 1-4. The player with more cards at the end is the winner.

For a bigger challenge: Play with 3 players and 1 referee. The referee still calls out the combined sum (or product), and each player must determine the value of her card by using the values of the two other cards, whose values are visible to the player.

MULTI-DIGIT WAR

Participants: 3 students (2 players + 1 referee)

Materials: 1 standard deck of cards, stopwatch

Before you begin:

1. Remove all face cards from the deck.
2. Aces are treated as 1s.
3. Decide whether all cards will represent positive values or whether red cards will represent negative values.

Setup: The referee starts with the 40 playing cards in a pile face down so nobody can see the numbers.

How to play:

1. The referee turns over the top 3 cards all at once so both players can see them.
2. Each player tries to determine the greatest possible value—in 30 seconds or less—using the 3 cards to create a product of a two-digit number and a one-digit number. Each player may only call out one value. For example, suppose these 3 cards are turned over by the referee: 4♥, 7♦, 5♠. The possible products are $(47)(5) = 235$; $(45)(7) = 315$; $(74)(5) = 370$; $(75)(4) = 300$; $(54)(7) = 378$; and $(57)(4) = 228$.

3. The person who calls out the highest value that is possible to create gets to keep the 3 cards. This is the end of round 1.

4. For the next 12 rounds, repeat steps 1-3. The player with the greater number of cards at the end is the winner. (The referee will have 1 card left.)

The instructions for Salute and Make 100 are based on the Science Education Partnerships website maintained by Corvallis School District 509J and Oregon State University. (<http://seps.mgd-colo.peak.org/Math%20Page/Math%20Night%20PDFs/Simple%20games%20to%20play%20at%20home.pdf>)

MAKE 100

Participants: 2-4 players

Materials: 1 standard deck of cards (for 2 players), 2 decks of cards (for 3-4 players), stopwatch

Before you begin: Aces are 1s; Qs and 10s are treated as 0s; and Ks and Js are wild cards.

Setup: Select 1 player to also be the dealer.

How to play:

1. The dealer deals 6 cards face down to each player.
2. Each player looks at his own 6 cards and chooses any 4 of the cards to make two 2-digit numbers with a sum as close as possible to 100. Wild cards can be assigned any value 0-9. For instance, two options for a player with A♥, 8♠, 4♠, A♣, J♣, 10♥ would be $8♠A♥ + J♣10♥ = 81 + 20 = 101$ or $4♠8♠ + J♣A♥ = 48 + 51 = 99$.
3. After all players have selected their 4 cards (within 30 seconds), everyone shows his 4 cards and the sum they make. Players may not change their cards or sum.

4. Each player records his numbers and the sum on the Make 100 Score Sheet. The player's score for each round is the absolute difference between his sum and 100 (the sums of 101 and 99 above both result in a score of $|101 - 100| = |99 - 100| = 1$).

5. Each player's used cards are discarded, and the 2 cards remaining in his hand are kept for the next round. This is the end of round 1.

6. For rounds 2-6, the dealer deals 4 more cards to each player each round. Then the players repeat steps 2-4. At the end of round 6, the player with the lowest grand total score wins.

Scoring variation: Always subtract 100 from a player's total to get his score. A total of 105 results in a score of $105 - 100 = 5$; a total of 95 results in a score of $95 - 100 = -5$. The player with the grand total score closest to 0 wins.

Make 100 Score Sheet

I ♥ Math ♣ !

Example: $52 + 47 = 99 \rightarrow |99 - 100| = 1$

Round 1: $\underline{\quad} + \underline{\quad} = \underline{\quad} \rightarrow | \underline{\quad} - 100 | = \underline{\quad}$

Round 2: $\underline{\quad} + \underline{\quad} = \underline{\quad} \rightarrow | \underline{\quad} - 100 | = \underline{\quad}$

Round 3: $\underline{\quad} + \underline{\quad} = \underline{\quad} \rightarrow | \underline{\quad} - 100 | = \underline{\quad}$

Round 4: $\underline{\quad} + \underline{\quad} = \underline{\quad} \rightarrow | \underline{\quad} - 100 | = \underline{\quad}$

Round 5: $\underline{\quad} + \underline{\quad} = \underline{\quad} \rightarrow | \underline{\quad} - 100 | = \underline{\quad}$

Round 6: $\underline{\quad} + \underline{\quad} = \underline{\quad} \rightarrow | \underline{\quad} - 100 | = \underline{\quad}$

GRAND SCORE: _____

Make 100 Score Sheet

I ♥ Math ♣ !

Example: $52 + 47 = 99 \rightarrow |99 - 100| = 1$

Round 1: $\underline{\quad} + \underline{\quad} = \underline{\quad} \rightarrow | \underline{\quad} - 100 | = \underline{\quad}$

Round 2: $\underline{\quad} + \underline{\quad} = \underline{\quad} \rightarrow | \underline{\quad} - 100 | = \underline{\quad}$

Round 3: $\underline{\quad} + \underline{\quad} = \underline{\quad} \rightarrow | \underline{\quad} - 100 | = \underline{\quad}$

Round 4: $\underline{\quad} + \underline{\quad} = \underline{\quad} \rightarrow | \underline{\quad} - 100 | = \underline{\quad}$

Round 5: $\underline{\quad} + \underline{\quad} = \underline{\quad} \rightarrow | \underline{\quad} - 100 | = \underline{\quad}$

Round 6: $\underline{\quad} + \underline{\quad} = \underline{\quad} \rightarrow | \underline{\quad} - 100 | = \underline{\quad}$

GRAND SCORE: _____