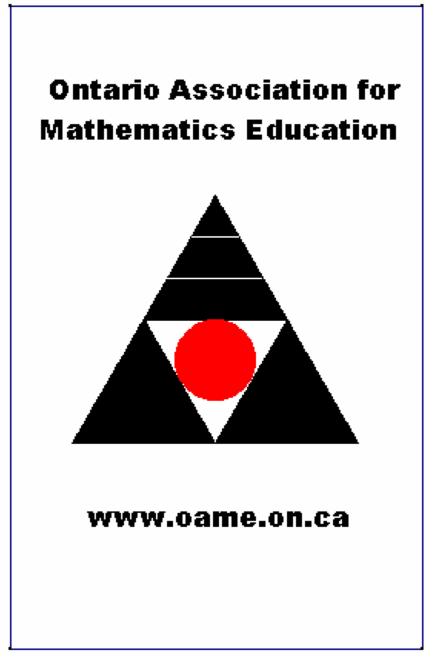
USING PLAYING CARDS IN THE CLASSROOM

You can purchase a deck of **oversized** playing cards at:
www.oame.on.ca



PRODUCT DESCRIPTION:
Cards are 4 ½ " by 7". Casino quality –paperboard stock, plastic coated. The cards have the standard face, pictures, number and pips. As well as Jokers, there are four cards with mathematical card tricks.

CARD TRICKS, AND TEACHERS NOTES

⊇ What's the Pattern

Goal: To create and describe a pattern.

Game: See playing card.

Teachers Notes:

⊄ Closest to 24!

Goal: To create a number sentence that equals 24.
Game: See playing card.

Teachers Notes:

OAME members can access more games, tricks and other activities involving playing cards at:

www.oame.on.ca

Grade K to 2

What's My Pattern?

Goal: Create and describe a pattern.
Game: Players take turns facing 2 cards up at a time and organizing them to create a pattern. The first player to create and describe a pattern (repeating, growing) that has 3 repetitions win.

Grade 3 to 6

Closest to 24!

Goal: To create a number sentence that equals 24.
Game: Players take turns facing 3 cards up at a time. Using the card values, each players takes turns identifying a number sentence that has a value equal to or close to 24. Number sentences can include operations of addition, subtraction, multiplication and division. Number cards are worth their face value; Jack, Queen and King are worth 10; Aces are work 1 or 11. The player who reaches a cumulative total of 500 first, wins!

⊆ AT –TEN –TION

Goal: Determining pairs of number that add to 10.

Trick: See playing card.

Teachers Notes:

Modifications:
You may remove the J, Q and K to make the process simpler.

How the trick works:

Apart from the three cards the student has, EVERY one of the remaining 49 cards is face up during the trick. Suppose the three cards
are 2, 5, and 7.

2 is covered only in combination with 8. So during the course of the trick, either when covering pairs or later putting two piles together, three 2's are covered with three 8's. However, one 8 must remain at the end because its partner 2 is one of the missing cards. 10's are covered by themselves and a J, Q, and K combination is covered as a triplet.

With our example of 2, 5, and 7, we must be left at the end with three piles, one with an 8 on top, one with a 5, and one with a 7.

AT-**TEN**-TION

- Have a student pick out three cards and keep them hidden.
- Ask. "Do any two of your cards add up to ten?" If "yes", trade one of the two offending cards so that the answer is "no".
- Lay about 12 cards face-up on the table.
- Cover pairs that add to 10, cover 10 by itself and cover Jack, Queen, King as a set. For example, if you see an 8 and a 2, cover each with another card face up because this pair adds to 10. If you see a Jack, Queen and a King, cover all three cards.
- If at any stage, there are no cards to cover, put another couple cards face-up making new piles.
- Continue this process until you run out of cards. If you end up with one extra card, simply place it on the table face up as a separate pile.
- Now, combine piles using the same rules as in step 4. For example, a pile with a 3 on top is combined with a pile with an 7 on top. Set these aside.
- When there are no piles left that you can collect, you will be able to figure out the 3 missing cards by their missing pair.

CONGRATULATIONS!!!

Here are some examples:
You are left with 2 and 5—solution 8, 5, 10
You are left with 3, J, Q—solution 7, K, 10
You are left with nothing!—solution 10, 10, 10 or J, Q, K. Which? You would most likely remember if you had covered only one 10 and so three 10's. Otherwise, J, Q, K.

At the beginning, we ask whether any pair add to 10. Suppose the student had 3, 6, and 4. Then at the end, we would have only one pile, with a 7 on top. An alternative to exchanging one of the cards is to treat J as 11, Q as 12 and K as 13. Now ask whether any two cards add to 13. If not, do the trick based on 13'S

So how can I use this?
- Get students to figure out how the trick works and explain it in a Journal.
- Have students remove only certain combinations of cards to create a new trick that uses a new addition fact. For example: Use pairs to make 13. (A = 1, K = 13, Q = 12, J = 11)

⊂ From Order to Disorder

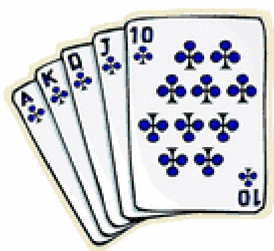
Goal: Students use logic to determine how to find the sequence.

Trick: See playing card.

Teachers Notes:

Here are two ways to solve this puzzle without trial and error.

1) Do the trick in reverse. Face up, pick up the K. Then pick up the Q and put it behind the K. Now flip the K behind the Q. (This is the reverse of "under".) Now put the J at the back and put the front card (which would be the Q) behind it. Now put the 10 at the back and put the front card (K) behind it. Now put the 9 at the back and put the front card behind it. And so on…



2) THE BETTER WAY!!

Draw 13 dashes representing the 13 cards.

___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

We don't know what goes in the first or third or fifth or seventh or ninth or eleventh or thirteenth positions YET! But we know for sure that the even positions must be

___ _A_ ___ _2_ ___ _3_ ___ _4_ ___ _5_ ___ _6_ ___

When you go through these cards, the A, 2, 3, 4, 5, and 6 are NO LONGER in the pile. So after the 6, the 13^{th} card is **the next to go under** and the 1^{st} card must have been the 7. Here is the most crucial step. The **NEXT CARD TO GO UNDER IS THE 3^{rd}!** And the 5^{th} position is 8.
7^{th} under and 9^{th} is the 9.
11^{th} under and 13^{th} is the 10.
3^{rd} under and the 7^{th} is J.
11^{th} under and the 3^{rd} is Q.
The only remaining card is the 11^{th} which is of course K. So we have : 7 A Q 2 8 3 J 4 9 5 K 6 10

This is much easier to do than to describe. There is nothing sacred about the thirteen cards. You could ask the students to arrange all four suits to come out in any order and both methods work.

Order from Disorder

- Select all thirteen cards of one suit and **arrange then face down in this order**: 7, A, Q, 2, 8, 3, J, 4, 9, K, 5, 6, 10 so that the 7 is on the top of the pile, face down and the 10 is on the bottom. (*This is not the solution!*)
- Now show the students what you want to happen. Take the top card in your face down pile (that is the 7) and put it on the bottom of the pile.
- Now put the next card in your pile face up on the table. So now the Ace is on the table face up.
- Now put the next card in your pile (the Queen) on the bottom.
- Put the next card in your pile, 2, face up on the table.
- Continue this and you will have A, 2, 3 and 4. Stop here and say "Of course the next one will be..." The students will yet out, "FIVE!" Deal it and K emerges. Say " Whoops, I guess I messed up. Say to the students "Your job: take the 13 cards and put them in order so that you can do CORRECTLY what I messed up." Keep going, card under, card face up on the table, card under, card face up, so that you obtain A, 2, 3, 4 , 5, 6, 7, 8, 9, 10, J, Q, K."

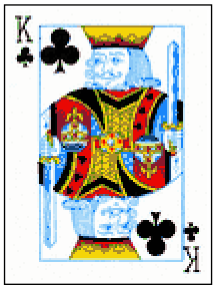
The students will mostly attack this problem by trial and error. They will find it easy to get it to work up to 6, even 7. Then it gets harder.

The solution: 7, A, Q, 2, 8, 3, J, 4, 9, 5, K, 6, 10

⊇ Thirteen is King!

Goal: Use math to explain how this trick works.

Trick: See playing card.



Teachers Notes:

Suppose one of the face up cards at the beginning is 4. The student places 9 cards on top of the 4, counting from 5 to 13. So there are 10 cards in that pile. Later, the pile is face down with the 4 on top. When the 4 is turned face up, you count out 4 cards. So that pile has 14 cards in all.

If the original card was *x*, you count out 13 – *x* cards. With the original card that makes 14 – *x*. Later, you count out *x* cards for that pile. So regardless of the value of the original pile, in the end there will be 14 cards.

Thirteen is King

- Start by explaining the value of the cards. Ace = 1, Jack = 11, Queen = 12 and King = 13. All other cards are worth their face value.
- Now, give the deck to a student and turn your back so that you cannot see the cards. Say " Pick out any three cards. Lay them face up on the table."
- While your back is still turned. Say " Now suppose one card is for example, 9. Count and place four cards face up on the 9, in effect counting 10, 11, 12, 13. If the card were a 2, you would place eleven cards on top of the 2, in effect counting, 3, 4, 5 ... 12, 13. Do the same for the other two cards, that is, count from the value of the card up to 13.
- "Turn all three piles over so that they are face down so each pile will have the original card on top."
- YOU now turn around and take the remaining deck. Say, "point to one of your original cards. I will determine what that card is. Turn the TOP card on each of the other two pole face up."
- When that is done, for each of the two face up cars, YOU count out, face down, the number of cards equal to the value on the card, Suppose , for example, there is a 4 showing on one pile, Count out four cards, face down on top of the 4. Do the same for the other pile.
- Now count out 10 cards face down from the cards remaining in the deck.
- Give the left over cards to the student and say "Count those cards. Done? Good. Now turn over the card you wanted me to guess." Miraculously, the number of cards remaining = the card to be guessed!

If you did this for ALL THREE piles (we only do it for two), we would have 14 X 3 = 42 cards counted out and therefore, 10 left in the deck.

But we only do it for TWO piles and then we count out 10 more cards. That means there are 2 X 14 +10 = 38 cards "ac**count**ed" for and 14 left over. If the card to be guessed has a face value of *x*, there are 14 – x cards in that remaining pile. AND so there must be exactly cards left in the deck!

So how can I use this?

- Get students to explain how this trick works mathematically.
- Have students make their own trick by removing some of the cards.

⊄ Which Row is it in?

Goal: To use rows and columns to identify a position.

Trick:

Row 1	11	12	13	14
Row 2	21	22	23	24
Row 3	31	32	33	34
Row 4	41	42	43	44

∈ With the deck face down, deal **face up** four rows of four cards. Point and say to the student, "This is row 1, this is row 2, this is row 3, and this is row 4. Pick a card. **DON'T** tell me what card it is. **Do** tell me what row it's in."

∉ Suppose the student says the card is in row 2. Suppose, though you don't know this yet, the card is in position (2,3), that is second row and third column. **AS CASUALLY AS YOU CAN**, pick up the cards face up in this order, placing each card underneath the previous one: 44, 34 (underneath 44), 24, 14, 43, 33, 23, 13, …, 21, 11, that is pick up the fourth column from the bottom to the top, then the third, then the second, then the first. Turn the pile of 16 cards over. Now the second card in your pile is (2,1), the sixth is (2,2), the tenth is (2,3), and the fourteenth is (2,4).

∠ Deal the cards into four rows again, first row 1, then row 2, and so on. The original cards now are in the positions on the right. The original row 2 is now column 2. Now say, "Tell me the row your card in now." The student should say row 3. You now know for sure the correct card is in the row 3 column 2 position. The student doesn't know you know! Don't tell.

11	21	31	41
12	22	32	42
13	$\boxed{23}$	33	43
14	24	34	44

∇ Pick up the cards again, casually sliding the correct card to the bottom and turn them face down, so the correct card is on top of your pile of sixteen.

®Deal face down four piles of four cards. The correct card is on top of the fourth pile. Say, "Pick two piles." If the student chooses the correct pile among the two, say, "Okay, we keep these and discard the other two!" If the student does not pick the correct pile, say, "Okay, we toss the two you've chosen and keep these two." Either way, you push aside two piles.

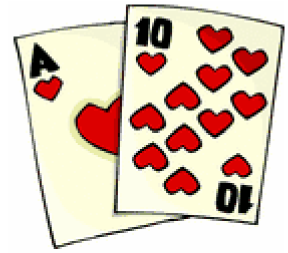
© Put the correct pile on your right, the other on your left. "Choose one." Now keep or discard as appropriate.

™ From the last pile, deal two piles of two cards each. Now your card is on the bottom of one of these piles. "Choose!" Discard or keep and make a pile of each of the final two cards. "Choose!" Discard or keep and say, "Okay, we toss this one and keep this one. Hmm. Here is your card!"

Teachers Notes:

Suppose the chosen card was in the second row. You have collected the cards and re-dealt them so that the second row became the second column, that is each new row contains exactly one card from the original row 2. If the student says the card is in row three, it must be the card in third row, second column. Everything else that follows is just for fun to make the trick seem more amazing! But this requires fast hands. Practice!

⊆ War



Goal: Determine who has the higher value.

Regular Game:

Two players: In the basic game there are two players and you use a standard 52 card pack. Cards rank as usual from high to low: A K Q J T 9 8 7 6 5 4 3 2. Suits are ignored in this game.

Deal out all the cards, so that each player has 26. Players do not look at their cards, but keep them in a packet face down. The object of the game is to win all the cards.

Both players now turn their top card face up and put them on the table. Whoever turned the higher card takes both cards and adds them (face down) to the bottom of their packet. Then both players turn up their next card and so on.

If the turned up cards are equal there is a **war**. The tied cards stay on the table and both players play the 3 cards from their pile face down and then another card face-up. Whoever has the higher of the new face-up cards wins the war and adds all the cards face-down to the bottom of their packet. If the new face-up cards are equal as well, the war continues: each player puts another card face-down and one face-up. The war goes on like this as long as the face-up cards continue to be equal. As soon as they are different the player of the higher card wins all the cards in the war.

The game continues until one player has all the cards and wins. This can take a long time.

Most descriptions of War are not clear about what happens if a player runs out of cards during a war. There are at least two possibilities:

1. If you don't have enough cards to complete the war, you lose. If neither player has enough cards, the one who runs out first loses. If both run out simultaneously, it's a draw. Example: Players A and B both play sevens, so there is a war. Each player plays a card face down, but this is player B's last card. Player A wins, since player B does not have enough cards to fight the war.

2. If you run out of cards during a war, your last card is turned face up and is used for all battles in that war. If this happens to both players in a war and their last cards are equal, the game is a draw. Example: Players A and B both play sevens, so there is a war. Player A plays a card face down, but player B has only one card, so it must be played face up. It is a queen. Player A plays a card face up and it is also a queen, so the war must continue. Player B's queen stays (B's last card) while player A plays a card face down and one face up, which is a nine. Player B wins the war and takes all these seven cards (the five cards that A played and the two cards that B played) and the game continues normally.

War for three or four players

War can also be played by three or more players in much the same way. Deal out as many as possible of the cards so that everyone has an equal number (17 for 3 players, 13 for 4).

All players simultaneously turn over a card and the highest wins all the cards tuned up. If two or more players tie for highest there is a war - everyone plays their next card face-down and then turns up a third card. This continues until one of the face-up cards is higher than all the others, and then that player wins all the cards in a war.

Note that all players take part in a war, not only the ones who had the highest cards.

A player who runs out of cards drops out. The game goes on until only one player has cards, and that player wins.

MATHEMATICS VARIATION:

The **Ace is equal to 1**. The number cards are equal to their number value. The face cards are equal to 10, or you may assign specific numbers to the Jack, King, and Queen. (Jack = 11, King = 12, Queen = 13)

The entire deck is dealt, half to player A and half to player B. (If you have a larger group, split the deck among them)

In case of wars, the usual rules apply. The tied cards stay on the table and both players play the 3 cards from their pile face down and then another card (or pair of cards) face-up. Whoever has the higher of the new face-up cards wins the war and adds all the cards in play to their packet.

¬ Whole Number War

Goal: To determine who has the higher card **pair**.

Game: The play proceeds as in WAR, except that on each turn each player turns over **TWO** cards. If you are playing addition war then the players adds the value of their two cards. If you are playing subtraction war then the players would subtract the value of their two cards. If you are playing multiplication war then the players would multiply the value of their two cards. The player with the higher **sum**, **difference**, or **product** would win all the cards.

If you are playing **division** war then the players would divide the two cards. The player with the higher whole number quotient takes all the cards. (Drop the remainder.)

When there is a tie, three cards are placed face down and then two additional cards are turned face up to break the tie. The game continues until one player has all of the cards and wins the game.

Modifications: You could use an operations dice to determine which operation is being done during that round.

∧Integer War

Goal: To determine who has the higher integer.

Game: All the **black cards are positive**. All the **red cards are negative**.

Players turn over their cards. The player whose card has the highest value wins all the cards.

For example, if players had -2, -17, 3, and -8, the person who had the 3 card would win.

Modifications: Have students turn over **TWO** cards an have them **add**, **subtract** or **multiply** the integers. The student with the highest result wins. Allow students can choose the order of the cards (for subtraction).

∨ Exponent War

Goal: To determine who has the higher power.

Game: Each player turn over **TWO** cards and chooses which card is the exponent and which is the base in order to achieve the highest value. The player with the higher value takes all four cards. For example, an Ace and a 6 could be one to the sixth power, OR six to the first power.