Game rules

The basic rules are very similar to pexeso. Jettons are placed on the playing area with the black and white side on top. The color side of the jettons is facing down and therefore covered. The principle of the game is to find two jettons that are identical on the color side. The game package contains several difficulty variants. These differ mainly in number of jettons used in the game and in playing time. Initially, we recommend playing lighter variants, especially if children are learning the game. Game variants are described below.

Game preparation

1. Distribute the cards irregularly on the playing area with the black and white side on top. The random layout of the game map teaches children better orientation and helps them to create coherent thinking.
2. Each player turns over a jetton with number 1 on the top. The numbers on the bottom (color) side of the turned jettons determine the game order. The player with

the lowest number plays first and the player with the highest number plays last.
3. If more players happen to uncover the same number on the color side, those players repeat step 2.
4. Players sit around the playing area so that their arrangement corresponds to the game order.
5. The exposed cards are covered again and placed on the same spot.
6. The first player starts!

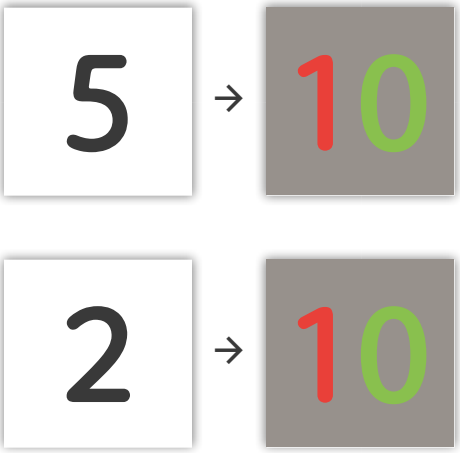
Game begins

1. The essence of the game is to find two jettons which are identical on the color side (both the number, color and background matches). So how the game differs from pexeso? Find out below.
2. Each player can turn over one or two jettons during the turn at his/her discretion (strategy). In lower versions we always recommend turn over two jettons.
3. Each player always has only one turn. Thus, it doesn't matter if the player manage to find an identical pair or not. Another player continues.
4. The game continues until all the jettons are collected.
5. At the end, points are counted and the winner is determined. If two or more players get equal points, the game ends in a tie.

Types of playing jettons

The game pack contains six basic groups of jettons which differ in graphic design and mathematical meaning. Each group has its own procedure according to which players look for identical jettons. The reasons why we have included the groups described below are explained in the additional materials.

Multiplication table grou up



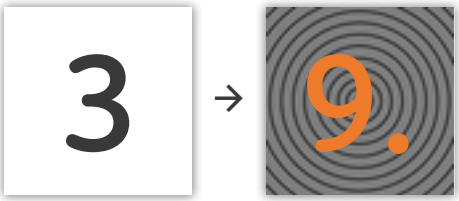
Jettons from this group have a multiplication factor on the black and white side and a multiplication product of these factors on the color side. The color side always contains a number on a gray background.

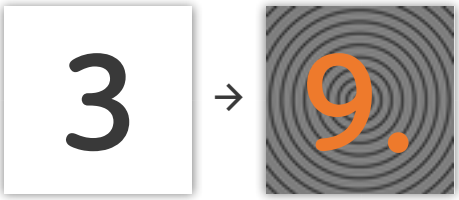
Example: A player turns over jetton number 5 and discovers number 10 on the color side.

5 is thus the first multiplication factor with product 10. The next jetton to be turned is number 2, the second multiplication factor. In other words $5 \cdot 2 = 10$

Following this method players find pair jettons from the Miltiplication table group. For the youngest of us who don't know numbers yet, we invented a helpful color ruler, the use of which is explained below.

Powers group





Power is a special case of multiplication, in which we multiply given number by the same number. Formally, the procedure is the same as for the Multiplication table group. Practically it is even easier.

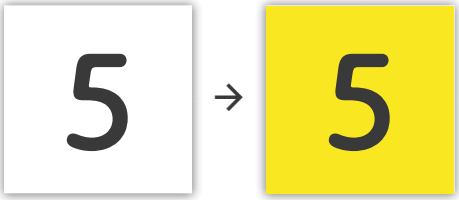
Jettons from this group always have a base number on the black and white side and a power on the color side. The color side always contains a monochrome number on a circular background.

Example: Example: A player turns over number 3 and discovers number 9 on the color side.

3 is therefore the base number and 9 is the power. Thus, the next jetton to be turned is also number 3. In other words $3^2 = 9$

Alternatively, the color ruler can be used as well, although it is not necessary because players always turn over two identical numbers.

Prime number group



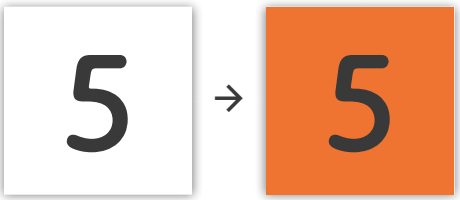
Prime number is a number that only has two factors: itself and 1.

Jettons from the prime number group always have the same number on both sides. The color side contains a black number on a yellow background.

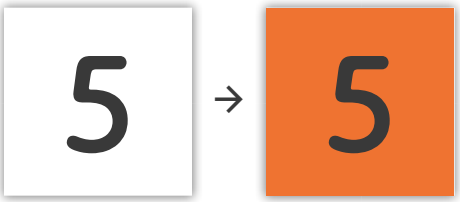
Example: A player turns over a jetton with number 5 and discovers also number 5 on the color side.

The next jetton to be turned is also number 5. The player is looking for the black five on yellow background.

Fibonacci numbers group p



Fibonacci numbers are numbers from a sequence, where each subsequent number is the sum of the previous two.

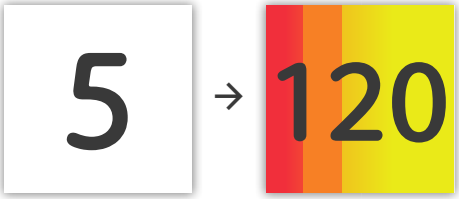


Jettons from the Fibonacci number group always have the same number on the black and white side as on the color side. The color side contains a black number on an orange background.

Example: A player turns over a jetton with number 5 and discovers also number 5 on the color side.

The next jetton to be turned is also number 5. The player is looking for the black five on orange background.

Note that jettons with a given numerical value on the black and white side can belong to more than one group. Only after turning the jetton over can be decided to which one. See example of fives belonging to prime numbers/Fibonacci numbers.



Factorial group

Factorial is a mathematical operation denoted by an exclamation mark and means that a given number is multiplied by all smaller natural numbers up to one. For example $5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 120$

Hereby we remind that children don't need to know anything we describe here to play Mathesso. All they have to do is orient themselves according to the graphics.

Jettons in the factorial group have either a number or an exclamation mark on the black and white side and the result of the factorial operation on the color side.

Example: A player turns over a jetton with number 5 and discovers number 120 on the color side.

5 is therefore the number to which the factorial operation is applied (little $5!$ on the jetton serves as a hint). As soon as factorial group jetton is recognized, the next jetton to be turned is one of $!$

Under the jettons with exclamation mark ! only the results of factorial operation are hidden.

Zero group

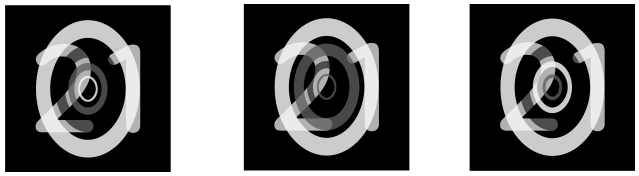
Jettons from the zero group always have a number on the black and white side and a zero on the color side. Moreover, there is another translucent number on the color side, which corresponds to the number on the black and white side.

Example: A player turns over a jetton with number 12 and discovers zero on the color side with translucent 12 in the background.

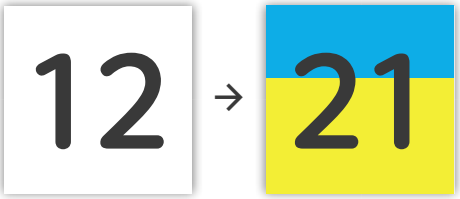
The next jetton to be turned is also number 12

Note: The following black jettons 19 17 19 23 29 , 31,41,43,71$ are not used.

Note: The following black jettons with translucent 21 are different, so they do not make pairs in either case.

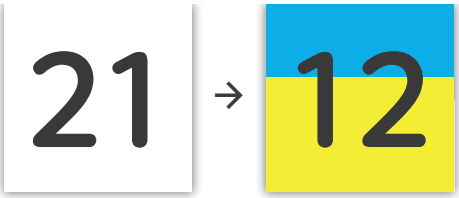


Cooper-Janeček extension (CJV)



Jettons from the CJV group are an extension of higher variants of Mathesso.

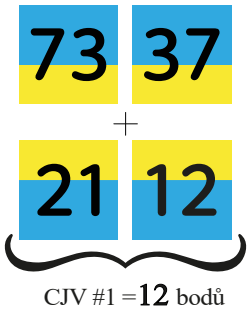
Example: A player turns over a with the number 12 and discovers number 21 on the color side.

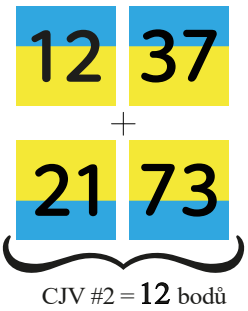


CVJ jettons always have a yellow-blue background on the color side.

The next jetton to be turned is 21 which has number 12 on the color side.

CJVs are the only combinations where numbers on the color side of the associated jettons are not completely identical. The digits of the numbers are reversed.

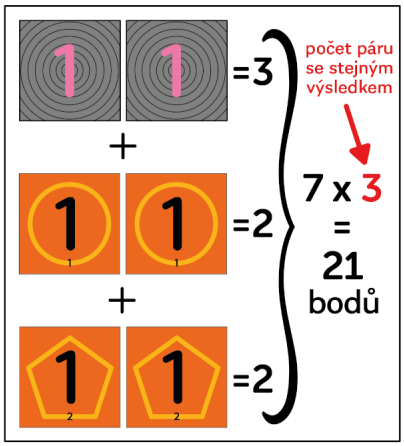


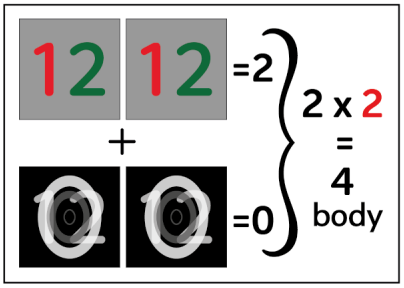


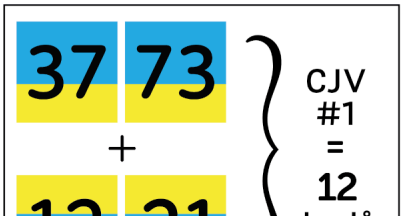
Counting of points

Players receive points for each pair of jettons found. The player with the highest number of points wins. Points are counted as follows:

- 0 points for each pair in the Zero group (black background)
- 1 point for each pair in the Prime number group (yellow background)
- 2 points for each pair in the Fibonacci group (orange background)
- 2 points for each pair in the Multiplication table group (bicolor number on a gray background)
- 3 points for each pair in the Power group (unicolor number on a circular background)
- 4 points for each pair in the Factorial group

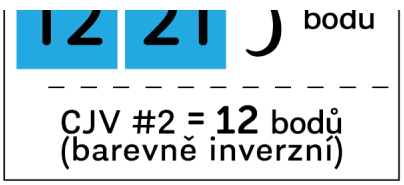






(rainbow background)

- 5 points for each pair in the CJV group (yellow-blue background)



Points for combinations f from multiple groups

If a player has more than one pair with the same numerical value, the points for these pairs are added up and multiplied by the number of pairs with this numerical value.

Example:

Thus, the player receives 2 points for a pair in Fibonacci number group and 2 points for a pair in Multiplication table group. That makes 4 points. Since these pairs have the same numerical value on the color side (both have number 21 on the color side), the points obtained are multiplied by two which equals 8 points in total.

Example:

Thus, the player gets 3 points for a pair in Power group and 2 points for a pair in Multiplications table group. Since these cards have the same numerical value, the sum of the obtained points is multiplied twice, ie $(3+2)\cdot 2 = 10$ In total, the player gets 10 points.

This rule does not apply to factorials and CJV pairs.

Zero group pairs do not add points per se,but multiply the number of points for certain other pairs that have the same number on the color side as is the translucent number in the background.

Example:

Thus, the player receives 2 points for a pair in Multiplication table group and 0 points for a pair of zeros. However, these zeros have translucent number 21 in the background, which means that the points multiply twice for every other pair with the numerical value 21 ie $(2+0)/cdot2=4$ points.

For example, if a player got a pair of zeros with translucent number 11 in the background, that pair would multiply another pair with number 11

A player who gets two pairs in a given variant (so-called Sheldon) with CJV gets 12 points and one extra move at any time during the game.

Use of color ruler

The color ruler is used for orientation when searching for pairs from the Multiplication table group. No knowledge of mathematics is required to use it. Orientation is purely based on colors.

Example: A player turns over number $7$and discovers bicolor number 21on the bottom.

Lets now use the color ruler to find the second multiplication factor of product 21. Each number has a color assigned to it on the ruler. One is pink, two is red, three is orange, seven is light blue, etc. To find the factors, we will do the following:

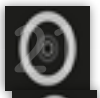
1. 1. The player places the jetton on the ruler so that the same colors on the ruler and the jetton touch. Firstly, the orange number two on the jetton is put next to the orange box on the ruler and then the light blue number one on the jetton is put next to the light blue box on the ruler.
2. 2. The numbers in the orange and light blue boxes of the ruler are the desired factors. Thus, number three and number seven, ie $3/cdot7 = 21$.

3. Children do not need to know the numbers to use the color ruler. They only work with colors and shapes of the numbers.

Game variants

The package contains several game variants, which differ in their difficulty and playing time. We describe these game variants below.

1. Atto
    - Select jettons with numerical value on the color side from 1 to 6 from the groups multiplication table, powers and prime numbers.
    - This variant is played the same way as memory game. Children work only with colors and shapes in order to find the identical pairs.
    - Points counting rules described above are not used in this variant. Whoever finds the most pairs wins.
2. Femto
    - Select all jettons with numerical value on the color side from 1 to 6 including Fibonacci numbers group.
    - Fibonacci jettons: 
3. Pico
    - Select all jettons with numerical value on the color side from 1 to 13, without the Zero group.
4. Nano
    - Select all jettons with numerical value on the color side from 1 to 21, without the Zero group.
    - We add black jettons 0/21 to the number 21 
5. Mikro
    - Select all jettons with numerical value on the color side from 1 to 37, without the Zero group.
    - We add black 0/34 to the number 34 
6. Mili
    - Select all jettons with numerical value on the color side from 1 to 73, without the Zero group.
    - We add black jettons 0/55 to the number 55 
7. Standart
    - Select all jettons with numerical value on the color side from 1 to 121.
    - We do not use the other zero/black chips, except for the ones already added (21, 34, 55).
8. CJV - Cooper-Janeček extension

- Select all jettons of the group 🔗 CJV.
- We add two pairs of black jettons 0/12 to the number 12 
- We add black jettons 0/21 
- We add black jettons 0/37 
- We add black jettons 0/73
- This ***CJV*** extension is optional and can be played from version Pico.

9. Factorial extension
   - Select all jettons of the group 🔗Factorial.
   - The ***Factorial*** extension is optional and it can be played from version Femto.