

The term “Nim” refers to a whole class of games. In general, two players take turns removing stones from one or more rows. Rules vary, resulting in a panoply of interesting games. We present just a few in ways that are particularly suited to a Festival or Math Circle. Nim is a two-person, perfect-knowledge game of strategy. *Perfect knowledge* means that there are no hidden cards or moves, and no dice to roll, and therefore that both players know everything about their positions.

By varying the number of piles, and the rules for picking up stones, we get different versions. Nim is often played as a *misère* game, in which the player to take the last stone loses. Nim can also be played as a normal play game, where the player taking the last stone wins. This is called normal play because the last move is a winning move in most games.

1. Watch *The unbeatable Game of Nim* <https://youtu.be/EiqJcQ7YxHw> to learn a version of Nim.

2. a) How many counters is each player allowed to remove ?(make a sentence)

- b) How many counters was there at the beggining of each game ?

- c) What is the strategy to win, that is to leave a single counter at the end ?

- d) How did Josie's dad manage to win even if Josie guessed the right strategy ?

A number of stones are lined up. Two players take turns picking up stones. In one turn, a player can pick up 1, 2, 3, 4, or 5 stones. A player cannot pass: she must take at least one stone and cannot take more than five stones. The player to pick up the last stone loses the game.

- You can play several games with your partner first :

Game 1	1	2	3	4	5	6	7	8	9	10	11	12
Game 2	1	2	3	4	5	6	7	8	9	10	11	12
Game 3	1	2	3	4	5	6	7	8	9	10	11	12
Game 4	1	2	3	4	5	6	7	8	9	10	11	12
Game 5	1	2	3	4	5	6	7	8	9	10	11	12
Game 6	1	2	3	4	5	6	7	8	9	10	11	12
Game 7	1	2	3	4	5	6	7	8	9	10	11	12
Game 8	1	2	3	4	5	6	7	8	9	10	11	12
Game 9	1	2	3	4	5	6	7	8	9	10	11	12
Game 10	1	2	3	4	5	6	7	8	9	10	11	12

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