

DICE-TAC-TOE

ACTIVITY GUIDE

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Materials and Setup

Per table (assuming 5 pairs of students per table), you will need:

Per Table	Material Preparation	
10 dice		
~150 colored tokens	Each pair of students needs ~15 tokens in two different colors, e.g., ~15 blue and ~15 red.	
3 copies of Instructions	1 page each	p. 5
5 copies of Game Boards	2 pages each <i>can be printed double-sided</i>	p. 6-13
1 copy of Table Sign	1 page <i>print on cardstock for sturdiness</i>	p. 14

Per Table	Purchasing Materials		
10 dice	pack of 110 for \$8.98		
Colored tokens	pack of 135 for \$7.99		
23 plastic sheet protectors	pack of 100 for \$6.50	pack of 500 for \$26.99	These are recommended in order to protect the documents that students will be handling.



Objective

Be the first player to get three numbers in a row on their game board.

Rules:

1. This is a two-player game. Each player uses a different color and plays on the same game board, like tic-tac-toe.
2. Players take turns rolling two dice.
3. A player can place a token on one empty square that either:
 - a. Matches the sum of the two dice
 - b. Matches the difference of the two dice
4. If a player cannot place a token, they skip their turn.

Materials

Each Dice-Tac-Toe table should be prepped for 5 stations of two students.

Each station needs:

1. 2 dice + about 30 colored tokens in two different colors, e.g., ~15 blue and ~15 red.
2. Dice-Tac-Toe instructions.
3. Dice-Tac-Toe game boards.

How to Play

We encourage you to explore the activity yourself ahead of time.

You can try our online version [here](#).

Introduce the activity without overexplaining it and without telling what strategies students might want to use. As much as possible, avoid giving away answers. Students should be encouraged to explore, experiment, and learn from their mistakes.

1. Model the rules using the dice and colored tokens to explain.
2. Play a game with the student or start a game playing against a pair of students. Then have them switch to playing against each other once they understand the game.

Standards

1. Make sense of problems and persevere in solving them. CCSS.MP1
2. Construct viable arguments and critique the reasoning of others. CCSS.MP3
3. Model with mathematics. CCSS.MP4



Asking Good Questions

1. Ask questions about confidence.
 - a. When a student asks you “Is this right?”, instead of saying “yes” or “no” right away, ask them how confident they are in their answer. Here are some examples:
 - i. “Maybe. What do you think? How confident are you?”
 - ii. “On a scale of 1-5, how confident are you in your answer?”
 - b. If a student is not confident in their answer, follow up by asking “What would help you feel more confident in your answer?” or “Why do you not feel confident?” This helps you determine how best to help the student through their explorations.
2. Ask students about choices.
 - a. When a student is stuck or shows you a wrong answer, instead of jumping in and showing the student the correct answer, start by asking about the choices that the student made along the way. Here are some suggested steps to follow:
 - i. Start from the beginning.
 - ii. Ask students to show you what they’ve tried so far.
 - iii. When the student gets to a point where they have different choices, ask the student “What other choices can you make here?”
 - iv. Have the student make a different choice and try to solve the puzzle. This helps the student see that they have the power to make different choices during an activity, and they’ll start to do this on their own in the future.
 - v. If you’re familiar with the puzzle or a particular solution, stop the student only when a different choice will help them get to the solution. This will help them feel successful faster without you giving away too much of the answer.
3. Ask students about strategies.
 - a. If a student is getting into the activity and has been doing it for a while, ask the student if there are any strategies they’ve come up with to help them solve the puzzle or win the game.
 - b. Follow up by asking if they think their strategies will work for all puzzles and/or larger puzzles, more complex puzzles, etc. Have the student explore more complex puzzles to test out their strategies.
 - c. This is a great way to encourage a student to dive deeper into an activity and to start looking for patterns, structure, and proofs.

Answers

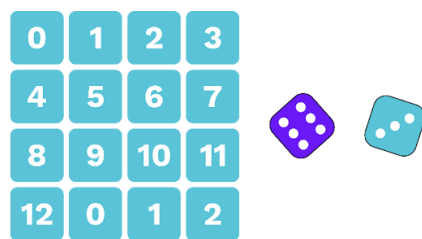
- Strategies will vary.



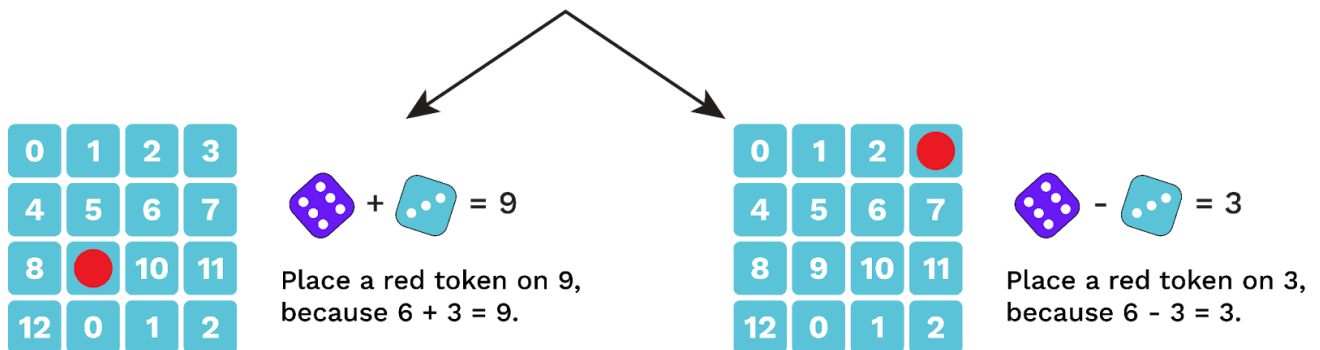
Dice-Tac-Toe Instructions

Rules:

1. This is a two-player game. Each player uses a different color and plays on the same game board, like tic-tac-toe.
2. Players take turns rolling two dice.
3. A player can place a token on one empty square that either:
 - a. Matches the sum of the two dice
 - b. Matches the difference of the two dice



The Red Player can either...



4. If a player cannot place a token, they skip their turn.
5. The first player to get 3-in-a-row wins!

Dice-Tac-Toe

Game #1

0	1	2	3
4	5	6	7
8	9	10	11
12	0	1	2

Dice-Tac-Toe

Game #2

0	2	4	6
8	10	12	1
3	5	7	9
11	0	2	4

Dice-Tac-Toe

Game #3

0	4	7	9
4	1	5	8
7	5	2	6
9	8	6	3

Dice-Tac-Toe

Game #4

4	5	0	1
3	9	10	2
2	11	12	3
1	0	5	4

Dice-Tac-Toe

Game #5

0	1	2	3	4
5	6	7	8	9
10	11	12	11	10
9	8	7	6	5
4	3	2	1	0

Dice-Tac-Toe

Game #6

10	9	5	2	0
6	11	8	4	1
3	7	12	7	3
1	4	8	11	6
0	2	5	9	10

Dice-Tac-Toe

Game #7

0	12	1	11	2
10	3	9	4	8
5	7	6	6	7
5	8	4	9	3
10	2	11	1	12

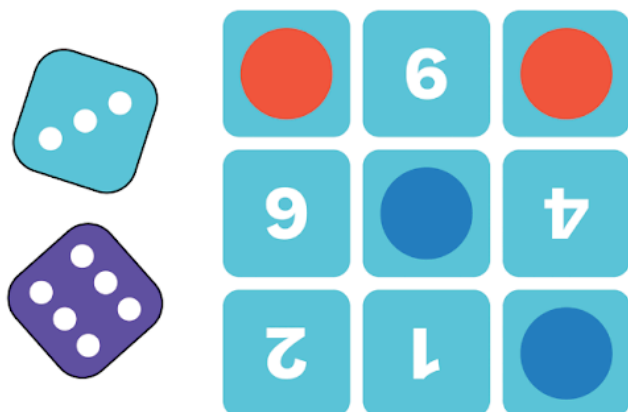
Dice-Tac-Toe

Game #8

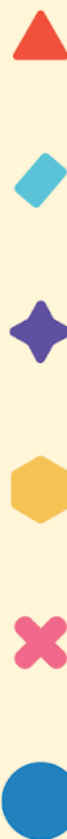
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5	12	10	12	5
6	11	1	11	6
7	12	10	12	7
0	2	3	4	0



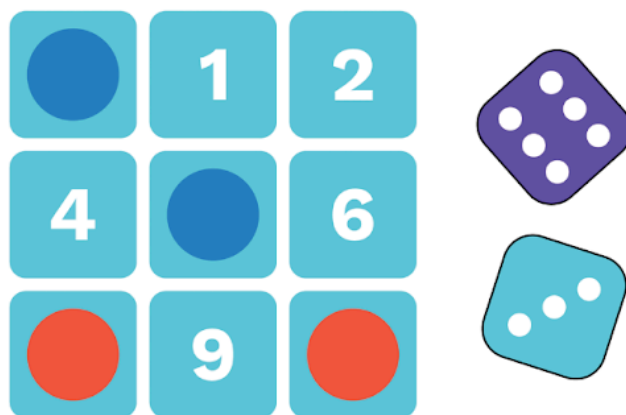
Play for free at
jrmf.org/puzzle/dice-tac-toe



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