"Contig": a game to practice and sharpen skills and facts in the four fundamental operations

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"Contig" is a game that intermediate-grade children love to play and with which they can challenge their older brothers, sisters, or parents. Four things are required —three dice, a score pad, markers, and a Contig board. The dice, pad, and markers are readily available, and a supply of boards can be made by reproducing the sample provided at the end of this article on sheets of paper.

Rules of the Game

1. Two to five players may play Contig.
2. To begin play, each player in turn rolls all three dice and determines the sum of the three numbers showing. The player with the *smallest* sum begins play. Play then progresses from left to right.
3. The first player rolls the three dice. He must use one or two operations on the three numbers shown on the dice. He is then allowed to cover the resulting number on the board with a marker. When he has finished his turn, he passes the dice to the player on his right. A player may *not* cover a number that has been previously covered.
4. To score in Contig, a player must cover a number on the board which is adjacent vertically, horizontally, or diagonally to another *covered* number. One point is scored for each *adjacent covered number.*
5. When a player rolls the dice and is unable to produce a number that has not already been covered, he must pass the dice to the next player. If he incorrectly passes the dice, believing he has no play when in fact he does have a play, any of the other players may call out the mistake. The first player to call attention to the error may place his marker on the proper uncovered number. This *does not* affect the turn of the player citing the error.
6. A cumulative score is kept for each player. A player is eliminated from further play in a game when he fails *in three successive turns* to produce a number that can be covered. When *all* players have experienced three successive failures to produce a coverable number, the game ends. The player with the highest cumulative score wins.

Variations of Contig

1. Use a one-minute egg timer to time the

CONTIG

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40
41	42	44	45	48	50	54	55
60	64	66	72	75	80	90	96
100	108	120	125	144	150	180	216

turn of each player. This will tend to speed up the game.

2. Allow any player to challenge an opponent if the opponent does not choose the number that will score the maximum number of points. The challenger should then receive the difference between the number of points scored by the chosen number and the greater number of points that could have been scored.

3. For a faster game, allow only five turns for each player. The player with the highest score at the end of the fifth round would be the winner.

4. Allow students to play it as a solitaire game and attempt to score as many points as possible before experiencing three successive unsuccessful rolls of the dice.

5. To make the game easier, use a four-by-five array and the numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 18, 20, 24, 25, 30, and 36. In this case, students use only *two* dice but play by the rules above.

Sample play (four players)

Suppose four players roll the dice in their respective turns as shown in table 1. Player 1 covers the 9 on the playing board $(2 + 3 + 4 = 9)$ but does not score because no other numbers have been covered. Player 2 covers the 10 on the board $([4 \div 2] \times 5 = 10)$ and scores 1 point because the 10 is adjacent horizontally to the already covered 9. Player 3 covers the 11 $([1 \times 5] + 6 = 11)$ and scores 1 point because the adjacent 10 has already been covered. Player 4 covers the 2 $(4 - [6 \div 3] = 2)$ and scores 3 points, one for the vertically adjacent 10 and one each for the diagonally adjacent 9 and 11.

Table 1

	Roll of dice	Number covered	Points scored
Player 1	2, 3, 4	9	0
Player 2	2, 4, 5	10	1
Player 3	1, 5, 6	11	1
Player 4	3, 4, 6	2	3

After the children have played the game for a while, questions like the following might be explored:

a) How were the numbers used in Contig selected?

b) What numbers would you use if you had two dice or four dice?

c) How many ways can you cover each number in Contig?

d) What is the highest score (without challenges) a player can make in a game?

e) Why are some numbers between 1 and 216 left off the Contig board?

f) Would it be possible to use all the numbers from 1 to 216 on a Contig board if the dice went from 1 to 10?

g) What is the probability of being able to cover 216 on your first throw?

h) Why is part of the Contig board still uncovered when everyone has passed three times?

Number Neighborhood

Rules

- Roll one die to see who goes first. Highest roll goes first, and play continues clockwise.

- The first player rolls all three dice and must use one or two operations on the three numbers. He/she records the move on the recording sheet and then colors in the resulting number on the board with a marker. Every player should use a different color marker.

SCORING: A player scores points by coloring a square adjacent (vertical, horizontal, or diagonal) to an already-colored square or squares. You score a point for every colored adjacent square. It is possible to score up to 8 points in one turn.
Note: Therefore, the first player will never score on his/her first turn - because there are no previously colored numbers on the board.

- If a player rolls and cannot color a number, the player must record a STRIKE in the column 'Points for Turn' and pass the dice to the next player. If he/she passes the dice in error and another player notices the play that could be made, that player may call attention to the error and place his/her counter on the number for points. This does not affect the turn of any players.

- When a player fails in three successive turns, he/she is eliminated. Play continues until there is only one player left. If you choose not to play the bonus round, the player with the highest cumulative score wins!

- **Bonus round:** After the game is over, each player is allowed 5 minutes to come up with as many expressions as they can for the numbers left on the board. They do not roll any dice, but are only able to use the numbers 1 to 6. They keep a list on the back of their recording sheet. After five minutes, they trade sheets and check each others' work. Each correct equation earns one bonus point.

NCTM Standard: Number & Operations

Grade level: Grades 4–8
Number of players: 2 or more (less is better)
Materials: Three dice, colored markers, student recording sheet, gameboard (1 for each game)

Number Neighborhood Student Recording Sheet   Name:_____

Turn	Roll	Expression	Value	Points from Turn	Total Points
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Number Neighborhood
Gameboard

216	8	42	21	100	6	15	120
1	5	41	96	9	75	50	26
29	150	66	10	32	90	28	80
27	45	38	13	39	2	3	12
22	72	40	35	64	37	60	54
14	31	34	25	4	16	20	55
19	108	11	33	125	23	18	17
48	180	30	36	7	44	24	144