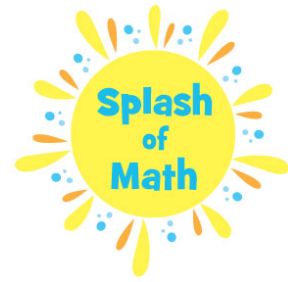


# Bouncy Dice Explosion

## Grades 3-5



### The Big Idea

Today you're going to toss bouncy rubber dice to see what numbers you roll. You'll also play War to see who's the high roller. Finally, you'll move onto a giant Bingo board, where you'll roll 3 dice and pick any number that could win!

### Supplies

#### In your kit:

- ★ Bouncy rubber dice: 20
- ★ Rock 'n' Roll Bingo Numbers: 1 set
- ★ Masking tape
- ★ Stickers: 2 sheets

#### You provide:

- ★ Paper: 1/2 sheet per kid

### Key Prep

- ★ Pre-cut a row of 9 gold star stickers for each player.

### Room Set-up

- ★ You'll need open space, at least a 6 x 6-foot rectangle, to toss the dice.
- ★ If you have space beyond that, set up the Rock 'n' Roll Bingo Grid ahead of time following the guide on page 5. Kids will stand on the grid, so leave space around each number so kids are not squeezed too close together when playing. The pack includes numbers for grade K-2 and 3-5, so you'll have some numbers leftover.

### What's the Math?

- ★ Addition
- ★ Multiplication
- ★ Simple combinatorials
- ★ Simple probability
- ★ Strategic thinking

### Kickoff

"Dice don't really roll, do they? Since they're cubes, with straight lines and angled corners, they bounce and tumble instead of rolling like a ball. Today we have some really bouncy dice to toss!"

### Going Airborne (10-15 minutes)

"First let's see what dice look like."

1. Hand 1 die to each kid. Have everyone count the sides and edges on it.
  - ? "What do you notice about the numbers on opposite sides of the dice?" **Discuss.**
  - Party Fun Fact:** See if kids catch that opposite sides always add up to 7!
2. Now collect the dice from everyone. Stand in the middle of a cleared area and toss all the dice into the air at once.
3. When the dice stop bouncing, have each kid find 1 die and count the dots facing up before picking up the die.
4. Kids with the same number on the face of their die stand together to make a human bar chart.
5. Count the kids in each row to find out how many times each number was rolled. Explain that this is the frequency of each number in the set of dice tossed in the air.
  - ? "Which number showed up the most often in your set?"
  - ? "What's the smallest total number of dots we could have rolled?" (Discuss. The lowest number on each die is 1, so 1 x number of kids in your set)
  - ? "What's the highest total?" **Discuss.** The highest number on each die is 6, so 6 x number of kids in your set.

### Extra Challenge (optional):

- ? "How often should each number show up?" **Discuss.** Explain probability helps us predict how often something will happen after many repetitions. Each of the 6 sides of a die has an equal chance of facing up, so the probability that any given number will show up is 1 in 6 (or  $1/6$ ). Each number (1, 2, etc.) should show on about  $1/6$  of the dice on the floor.
- ? Calculate the answer for the number of dice on the floor by asking the kids to divide the number of dice tossed by 6! If they need a hint: remind them that  $6=3 \times 2$ , so they can divide the number of dice tossed first by 2, then by 3.

### Rock 'n' Roll Bingo (25 minutes)

"Who likes playing Bingo? Today we're going to jazz it up. First, you're going to play on a giant Bingo board, where you are the chips. Secondly, you'll get to roll 3 dice and choose where to stand based on the numbers you roll! When 5 people are standing in a straight line (vertical, horizontal or diagonal) and yell 'Bingo!' they win."

1. If you haven't already done so, tape the Bingo numbers to the floor using the guide on page 5. Be sure to leave enough space around each number so kids aren't squeezed too close together when playing.

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2. The first player rolls 3 dice and decides where to stand: on a number shown on any 1 die, OR the sum of any 2 dice, OR the sum of all 3 - their pick! Encourage the players to work together to choose the best move.
3. If none of the numbers or sum of the dice match an open square, the player may roll again.
4. Repeat for each player in the group.
5. If you run out of players before anyone can yell "Bingo!", use shoes or other objects as placeholders. The players can start rolling again from their places on the board, in their original order.
6. As soon as 5 kids form a straight line, up/down, sideways or diagonal, yell "Bingo!" and win that round. Don't forget that the center space is free!
  - ? "What did you figure out that can help your chances of being in a winning row?"  
**Discuss** how you can choose a sum that lands in a row with more people already standing in it.
  - ? "What do you notice about the spaces on the board? Are some spaces less likely for people to land on?" **Discuss.** See if kids notice that some numbers, like 9 and 6, appear twice on the Bingo board.
  - ? "What else can boost your chances of being in a winning row? Are all sums equally likely to be rolled?"

### Extra Challenge (optional):

- ? "What are all the ways you can roll a total of 3 using all the dice?" **Discuss.** See if they figure out that there's only 1 set: 1, 1, and 1.
- ? "What other number is like that?" **Discuss.** Let the kids discover that 18 is equally unlikely: only 6, 6, 6 will work. If they suggest 12 (4,4,4) explain why 12 is not as hard to get: because other sums add to 12! such as 1, 5, 6, or 2, 5, 5, and so on.
- ? "So if 3 and 18 are least likely sums to roll, what sum do you think is most likely for 3 dice?" **Discuss.** See if the kids figure out that 7 is most likely for 2 dice (the midpoint between 2 and 12) 10 and 11 are most likely for 3 dice - split the midpoint between 3 and 18.
- ? "If some sums are more likely than others, how does that change your strategy?"  
**Discuss.** See if kids figure out that you should choose rows where the unfilled numbers are likely sums.
- ? "What if you want a combo like 1, 2, 3? How many ways can that show up on 3 dice?"  
**Discuss.** This is a major question in math! Let the kids work together to find the 6 ways that set can show up:

1, 2, 3	2, 1, 3	3, 1, 2
1, 3, 2	2, 3, 1	3, 2, 1

## War of the Dice (15 minutes)

"Has anyone played the card game War? If you have, can you tell us how to play?" **Discuss.**  
"In our bouncy dice version of War, you're going to roll dice instead of flipping cards!"

1. Have kids pair off with a partner and spread out on the floor. If you have an odd number of kids, you can make a group of 3.

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2. Give each kid 1 pair of dice, 1/2 sheet of paper, and a set of stickers (or pencil or crayon if you don't have stickers).
3. Each player rolls 2 dice and multiplies the 2 numbers to get the product.
4. The player who rolls the higher product wins the round and places a sticker (or makes a tick mark) on his/her paper.
5. In case of ties, there's no winner - simply roll again.
6. After kids have played a few rounds, ask:
  - ? "How often did each person win or lose?" **Discuss.**
  - ? "Each person has an equal chance of winning, so it should be 1/2 the time for each of 2 people, and 1/3 of the time for 3. Why?"
  - ? "What's the lowest product you could have rolled?" **Discuss.** The answer is  $1 \times 1 = 1$ .
  - ? "What's the highest product you could have rolled?" **Discuss.** The answer is  $6 \times 6 = 36$ .


### Extra Challenge (optional)

- ? "What do those products have in common?" **Discuss.** See if kids get that both 1 and 36 are perfect squares; you can multiply a number by itself to get that answer [ $1 \times 1 = 1$ ,  $6 \times 6 = 36$ ]. More importantly, there's only 1 way to roll each product: a 1 and a 1, or a 6 and a 6. So, you have a low chance or probability of rolling them.)

## Wrap Up

"We're really on a roll with these dice! Not only are we practicing our multiplication facts, we're also learning about the math behind probability, which is used to forecast weather and help coaches make decisions on game day!"

## Bingo Set-up Guide for Grades 3-5

11	7	2	17	4
9	18	6	13	16
10	9		15	6
3	11	10	8	5
12	8	14	1	7