Dice Activities for Math

Contents

Notes to Teachers

The Activities

Dice Activities for Math is designed for teachers and parents to use with children in grades K–3. These engaging, challenging, and fun activities build number sense and generate a conceptual base for number facts. One of the inherent values of the activities is that children enjoy revisiting them and, in so doing, have an opportunity to practice number facts without tedious paper and pencil drill.

Dice Activities provides opportunities to:

- reinforce number patterns
- construct efficient counting strategies
- construct and interpret graphs
- manipulate numbers mentally
- understand how numbers work
- develop fluency with math addition and subtraction facts
- introduce place value
- verbalize math understanding
- expose students to math vocabulary
- develop game strategy

The activities are organized into six sections. The first three sections use one-die, two-dice, and three-dice graphs and charts for adding, subtracting, and doubling numbers. The fourth section presents variations of halving a quantity using graphs and charts. In the fifth section, children are exposed to the concepts of tens and ones. The sixth section introduces fun Tic-Tac-Toe activities for practicing math facts, developing reasoning skills, and experiencing the probability of specific occurrences in tossing dice.

The first graph and chart activities focus on number pattern recognition. In the One-Die Match Graph activity (page 4), the child tosses a die and matches the pattern on the die with the dot pattern on the graph. The dot patterns

are arranged in numerical sequence. The child places a token above the dot pattern, creating a graph. In the Match the Die Pattern activity (page 5), the child tosses the die, finds the corresponding dot pattern on the chart, and places a token. The dot patterns on the chart are randomly placed and visually more challenging than the graph activity. The next activities are a graph and chart matching a dot pattern to a numeral.

Following the introduction of the counting activities, the dice activities become more abstract. If a child has yet to mentally conceptualize a number plus one, having a concrete model—the dots on the dice—to aid in counting helps make some of the activities more appropriate.

Many of the activities do not require writing numerals but can be modified to do so. For example, in the Double the Die Graph activity (page 16), children can write the equation in the box instead of placing a token. The Two-Dice Graph activity (page 30) can be used as a probability lesson. When children write all the possible addition equations that tossing two dice produces, they see which sums have the most possible outcomes and discover that a bell curve is produced.

Dice activities are an ideal way to differentiate classroom instruction. They can be introduced as whole-class instruction, used in small groups, individualized, used as an informal assessment, or provide a school–home link when shared with parents.

Questions to ask when using Dice Activities with an individual child, a small group, or a whole class. These questions will help you determine the child's level of understanding.

Dice Graph Activities (throughout book)

1. What is your favorite number?
2. What is the largest number you can toss with a die?
3. What is the smallest number you can toss with a die?
4. Say the column numbers from least to most.
5. Say the column numbers from most to least.
6. In the One-Die Graph activity (page 6), what number do you predict will be tossed?
7. What number do you think will get tossed the most?
8. What number do you think will get tossed the least?
9. Which column has the most? How do you know? How many does it have?
10. Which column has the least? How do you know? How many does it have?
11. Do any columns have the same amount? How do you know?
12. How many more does column _____ have than column _____?
13. Which has more, columns 2 and 3 or columns 1 and 6? How do you know?
14. If column _____ had 2 more, would it have the most?
15. What are the odd-number columns?
16. What are the even-number columns?
17. Do the odd-number columns have more than the even-number columns? How do you know?
18. How many more would you need to add so that the odd and even numbers have the same amount?
19. How many would you need to take away so that the odd and even numbers have the same amount?
20. Which columns have more than 2 but less than 6?
21. What is the largest number you can toss using two dice?
22. In the Two-Dice Graph activity (page 30), why is there no number 1?
23. What is the largest number you can toss using three dice?
24. What is the smallest number you can toss using three dice?
25. In the Three-Dice Graph activity (page 46), why are there no numbers 1 and 2?
26. In the One-Half-Die Graph activity (page 51), what numbers result in a whole number when cut in half?
27. What numbers result in a fraction or a whole number and a fraction when cut in half?

Meeting the NCTM Standards

	One-Die Activities Pages 3–25	*Two-Dice Activities Pages 29–41*	*Three-Dice Activities Pages 45–48*	*Half-Die Activities Pages 51–56*	*Tens and Ones Activities Pages 59–70*	*Tic-Tac-Toe Activities Pages 73–93*
NCTM STANDARDS						
Number and Operations						
Place value					✗	
Equivalent representations	✗		✗			
Fractions				✗	✗	✗
Addition and subtraction	✗	✗	✗	✗	✗	✗
Multiplication and division	✗					✗
Relationships between operations	✗	✗	✗	✗	✗	✗
Properties of operations	✗	✗	✗	✗	✗	✗
Fluency with operations	✗	✗	✗	✗	✗	✗
Using mental math	✗	✗	✗	✗	✗	✗
Estimation						
Selecting appropriate methods						
Data Analysis and Probability						
Predicting outcomes		✗	✗			✗
Problem Solving	✗	✗	✗	✗	✗	✗
Reasoning and Proof	✗	✗	✗	✗	✗	✗
Communication	✗	✗	✗	✗	✗	✗

One-Die Activities

Contents

Directions for One-Die Graph and Chart Activities

Objectives:

- Recognition of die dot patterns
- Recognition of numerals 1, 2, 3, 4, 5, 6
- Sequencing of numerals 1, 2, 3, 4, 5, 6
- Recording of numerals 1, 2, 3, 4, 5, 6

Materials

- 1 die
- Numeral cards 1 through 6
- Graph and chart activities using one die
- Tokens (tiles, cubes, chips)
- Pencils, markers, crayons

Warm-Up Activities

- Student tosses die and responds verbally with the numeral name.
- Student tosses die and responds by showing numeral card corresponding to the number pattern on the die.

die tossed

card shown

NOTE how student arrives at answer:

- Does the student count each dot?
- Does the student recognize the number of dots?

Recording on Graphs

- Student tosses die and writes corresponding numeral on the graph.
- If students have not been instructed on correct numeral formation, they can color in the boxes on the graph or place a token on a box to indicate that dot pattern has been tossed.

  Activity is completed when one column of numerals is full.

Discussion

- What die pattern was tossed the most? The least?
- Is there a tie?
- Which number:

  has almost as many as _____?

  has the second most?

  has the second least?

  more than? less than? one more than? etc.
- Encourage the students to ask one another questions about the graphs.
- Make a large class graph and record daily class results of which die patterns occur the most (probability).

Chart Activities

- Each player chooses a color token.
- Players toss die.
- Highest number goes first.
- Player tosses die and performs operation (add one, subtract one, and so on).
- Player finds number on chart and places a token on number.
- If number has a token on it, player loses a turn.
- Count the tokens to see who wins.

Race to 25

How to Play

- *Toss die. Highest goes first.*
- *Players take turns tossing die and moving their token that many boxes on the chart.*
- *Player must land exactly on **25** to win. First player to reach **25** wins.*

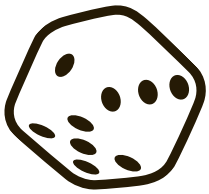
1	2	3	4	5
16	17	18	19	6
15	24	25	20	7
14	23	22	21	8
13	12	11	10	9

Die Plus Two Chart

- Each player chooses a color token (tiles, cubes, chips).
- Players toss die. Highest number goes first.

How to Play

- *Toss die.*
- *Add two.*
- *Find the number on the chart.*
- *Place one token on the number.*
- *If number has a token on it, lose a turn.*
- *Count tokens to see who wins.*



4	6	5	3	8
7	4	3	5	7
3	7	5	6	8
6	4	6	7	4
5	3	8	3	5
8	6	7	4	6

Die Minus One Chart

- Each player chooses a color token (tiles, cubes, chips).
- Players toss die. Highest number goes first.

How to Play

- *Toss die.*
- *Subtract one.*
- *Find the number on the chart.*
- *Place one token on the number.*
- *If number has a token on it, lose a turn.*
- *Count tokens to see who wins.*

1	3	0	2	5
4	1	2	0	4
2	4	0	3	5
3	1	3	4	1
0	2	5	2	0
5	3	4	1	3

Double the Die Chart

- Each player chooses a color token (tiles, cubes, chips).
- Players toss die. Highest number goes first.

How to Play

- *Toss die.*
- *Double the amount.*
- *Find the number on the chart.*
- *Place one token on the number.*
- *If number has a token on it, lose a turn.*
- *Count tokens to see who wins.*

4	6	10	12	8
2	4	12	10	2
12	2	10	6	8
6	4	6	4	2
10	12	8	12	10
8	6	2	4	6