

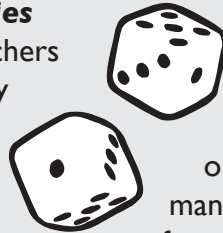
Dice Activities for Subtraction

Introduction

Successful math students manipulate numbers mentally. The activities in ***Dice Activities for Subtraction*** were created by teachers to engage students in developing fluency with the arithmetic operation of subtraction and the mathematical principles involved in thinking about subtraction in multiple ways. The activities are designed to empower students with the ability to address mathematical problems and challenges with a sense of curiosity and confidence.

The preceding books in this series stressed addition and multiplication facts. Research by well-known educational psychologists, including Piaget, has emphasized the challenge of subtraction as a more difficult operation than addition or multiplication for young students. The concept of “something missing” versus combining sums and repeated additions is a struggle for the young child. The activities in this book focus on the subtraction concept of “minus” (take away) as well as the concept of “difference” (comparison), providing ample opportunities to develop fluency with both concepts of subtraction.

These activities focus on the NCTM standards of Number and Operations. They also address the standards of Reasoning, Problem Solving, and Communication. The NCTM standards are the framework for all published mathematic programs as well as state and local curricula frameworks; thus, these activities are easily integrated into a scope and sequence whenever the topic is addressed. In some instances, the teacher will want to replace an activity in the school-based text with one found in this book, as the dice activities are challenging, more apt to produce long-term mastery, and develop an interest in and curiosity about math.



The authors currently use *Dice Activities for Subtraction* as part of their curriculum to train elementary-school teachers in how to teach mathematics. The activities require the use of dice, tiles, or tokens—commonly available classroom manipulatives. They provide an opportunity for students to play with mathematical ideas without paper-and-pencil drill.

Our work is continually expanding and we welcome any suggestions for modification of these activities that will lead to greater mathematical thinking on the part of our students.

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Notes to Teachers

Dice Activities for Subtraction is designed for teachers and parents to use with children in grades 1–3. These engaging, challenging, and fun activities build number sense and generate a conceptual base for number. Children enjoy revisiting the activities and, in doing so, have an opportunity to practice subtraction facts without tedious paper-and-pencil drill.

These dice activities provide opportunities to:

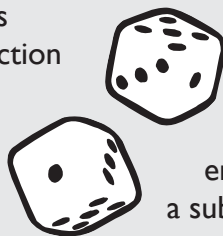
- Develop the concept of the difference between two numbers
- Develop the concept of minus—removing a smaller amount from a larger amount
- Develop fluency with basic subtraction facts
- Reinforce number patterns
- Develop game strategy
- Explore the probability concept of chance
- Develop communication and cooperation skills by working in teams of two students

Dice Activities for Subtraction is organized into eight sections. Each section presents a specific activity.

The **Graph** and **Chart** activities are paired introductory lessons to familiarize students with subtraction concepts. The simplicity of these activities makes each a tool for diversifying learning. Some students may find it beneficial to stay with these activities, developing recognition and fluency, while others are ready for more challenging involvement.

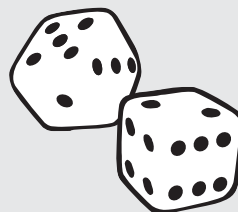
The **Table Completion** activities challenge students to fill in their chart before their opponent. Some **Table Completion** activities involve students working on a different subtrahend than their opponent.

The focus of the **Round** activities is to develop fluency with subtraction facts. Some **Round** activities involve subtracting multiples of 10 and multiples of 5.



Each **Pattern** activity presents four subtraction concepts that focus on developing recognition of subtraction patterns, with some activities emphasizing the ones place in subtracting a subtrahend and others emphasizing the tens place. Four **Table Completions** charts are aligned so that students can make generalizations about the patterns. The patterns are repeated as **Round** activities for students to practice their generalizations.

The repetition throughout the **Differences Between Two Dice** activities facilitates students' ability to quickly recognize the difference in value between two dice.



Notes to Teachers (cont.)

Hidden Number, similar to the game Concentration or Memory, asks students to not only compute the solution to a subtraction fact but also to recall under which tile the solution is hiding. Each concept is presented as a 3×4 grid, involving 12 possible hidden numbers, and a more challenging 5×5 grid with 25 possible solutions.

Each **Bingo** activity consists of five cards. If students are paired in teams of two, the activity will involve 10 students. One student acts as the “caller,” tossing a die or dice and calling out the number. All players involved in the game perform the required computation, and if all agree on the answer, the students look to see if they can place a token on their card. The first team to get bingo wins.

Tic-Tac-Toe and **Four-Grid Tic-Tac-Toe** are paired for each concept. **Tic-Tac-Toe** is a game of chance. The players are more dependent on the toss of the dice than in any of the other activities. The Tic-Tac-Toe activities are a simplified introduction to the subtraction concept.

Four-Grid Tic-Tac-Toe is less an activity of chance and more of skill than simple Tic-Tac-Toe because players have more opportunities to block their opponents. Players place three tokens in a row on as many grids as they can until all possible moves have been played. Players then count their sets of three tokens in a row to determine who has won.

Blank charts are included with each activity to give teachers and students opportunities to create their own dice activities.

Assigning the same activity but different subtraction concepts for specific students gives teachers opportunities to differentiate class instruction and homework assignments.

Encourage students to think their way through subtraction as a mental activity. If they are subtracting $15 - 4$, for example, ask them to first consider $15 - 5$, which is an easier equation to solve. Explore what they would have to do to use the answer from $15 - 5$ to solve $15 - 4$. If students are struggling with subtraction facts, suggest that they use the Hundred Chart on page vi to help them with their calculations.



Directions for Table Completion Activities

Objectives

- Practice computing the difference between two numbers from 0 to 100.
- Recognize number patterns when subtracting from a two-digit number ending in 0.
- Recognize number patterns when subtracting 10 from a two-digit number.
- Recognize number patterns when subtracting multiples of 5 from a two-digit number ending in 0.

Introduce the **Table Completion Charts** activity by demonstrating on an overhead and playing against the class. Two teams with two students on a team are suggested. Playing in teams gives students an opportunity to discuss moves and strategies and provides a check on correct computation.

Materials

- Chart
- Dice
- Pencil

How to Play

- Each team tosses a die. The higher number goes first.
- Taking turns, the teams toss a die or dice, circle the die value on the chart, subtract, and then record the solution next to circled number.
- If the number has been played, the team loses a turn.
- If a team records the wrong number, they erase it and lose a turn.
- The first team to complete their chart wins.

Suggestions

- Before writing a solution on the chart, team members either verbalize the subtraction equation (“ $11 - 7 = 4$ ”) or the difference (“The difference between 11 and 7 is 4.”).
- Encourage students to think their way through subtraction as a mental activity. For example, if they are subtracting $20 - 4$, ask them to first consider $20 - 5$, which is an easier equation to solve. Explore what they would have to do to use the answer from $20 - 5$ to solve $20 - 4$.
- If students are struggling with subtraction facts, suggest they use the Hundred Chart (page vi) to help them with their calculations.

Discussion

- Is this a game of luck or skill?

6 Minus a Die Table Completion

How to Play

- Each team tosses a die.
- Higher number goes first.



- Toss a die. Circle the die value on your chart.
- Subtract the number tossed from **6** and record the answer in the box next to the die value.
- If a box is already filled, lose that turn.
- First team to complete their table wins.

Team: _____

Die Tossed	6 -
6	
5	
4	
3	
2	
1	

Team: _____

Die Tossed	6 -
6	
5	
4	
3	
2	
1	

11/12 Minus a Die Table Completion

How to Play

- Each team tosses a die.
- Higher number goes first.



- Toss a die. Circle the die value on your chart.
- Subtract the number tossed from **11** or **12** and record the answer in the box next to the die value.
- If a box is already filled, lose that turn.
- First team to complete their table wins.

Team: _____

Team: _____

Die Tossed	11 -
6	
5	
4	
3	
2	
1	

Die Tossed	12 -
6	
5	
4	
3	
2	
1	

20 Minus a Die Table Completion

How to Play

- Each team tosses a die.
- Higher number goes first.



- Toss a die. Circle the die value on your chart.
- Subtract the number tossed from **20** and record the answer in the box next to the die value.
- If a box is already filled, lose that turn.
- First team to complete their table wins.

Team: _____

Team: _____

Die Tossed	20 -
6	
5	
4	
3	
2	
1	

Die Tossed	20 -
6	
5	
4	
3	
2	
1	

100 Minus a Die Table Completion

How to Play

- Each team tosses a die.
- Higher number goes first.



- Toss a die. Circle the die value on your chart.
- Subtract the number tossed from **100** and record the answer in the box next to the die value.
- If a box is already filled, lose that turn.
- First team to complete their table wins.

Team: _____

Team: _____

Die Tossed	100 -
6	
5	
4	
3	
2	
1	

Die Tossed	100 -
6	
5	
4	
3	
2	
1	