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Introduction

Mental math involves the ability to quickly make mathematical calculations without the aid of a calculator, paper and pencil, or a computer. The problems in *Mental Math* provide daily opportunities for children to practice mental calculations as well as improve their math, listening, problem-solving, and communication skills. Children learn and store math facts and operations during each mental calculation and apply this knowledge to the solution of new problems.

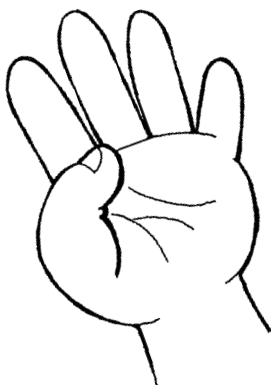
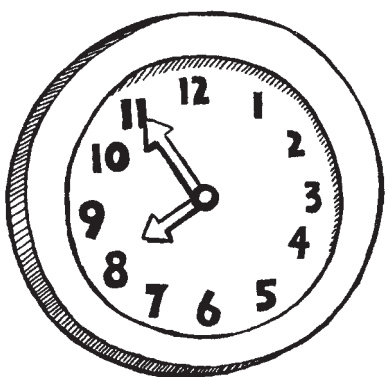
Mental math problems are a great way to start your class's day. Use them to help children focus, listen, and warm up. Need to fill a few minutes in your daily schedule? The problems in *Mental Math* also make perfect “sponge” activities. Adapt the problems to meet your unique instructional needs and make them an essential component of your daily classroom schedule.

This resource features 110 mental math problems on reproducible cards;

suggestions for using the problems for individual, small-group, and whole-group activities; assessment tips; and a reproducible record chart and game sheet. Designed to reinforce your whole-class lessons, the problems include the following content and process areas from the National Council of Teachers of Mathematics:

- number and operation
- patterns
- geometry
- data analysis
- problem solving
- reasoning and proof
- communication
- connections
- representation

Encourage children to think of the problems as having “friendly numbers”—numbers they can easily compute in their head—and you will create a learning environment where all children experience mental math success!



Getting Started

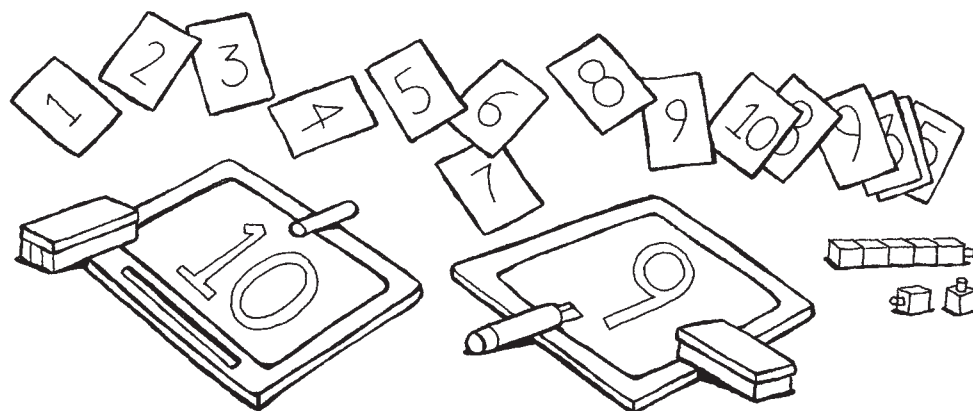
Introduce mental math problems at the beginning of the year. Use them to build on current math concepts. Start by photocopying and cutting apart the reproducible mental math cards. Read each problem in advance to make sure children are familiar with the math concept(s), skill(s), and interdisciplinary facts needed to correctly calculate the answer. Refer to page 6 for an explanation of the skills that relate to each math concept presented in this book. You may choose to present one or several mental math problems per day in the sequence that best meets the needs of your class. Modify individual problems to make them easier or more challenging, depending on the skill level of your children.

Read a mental math problem to the class. Give children ten seconds to calculate each step of the problem. (The answer for each step is listed in parentheses for quick reference.) If you find that some children are struggling with mental calculations, ask them to show their answer for each step (rather than just their final answer), or allow them to trace their hands on construction paper, cut out their

tracings, and touch the traced fingers as they calculate. Remember that the ultimate goal of mental math is for children to correctly calculate their answers without visual aids or hands-on manipulatives.

The problems in *Mental Math* direct children to whisper their answer to their neighbor or show it on their fingers. However, feel free to modify the directions to have children answer problems by showing the appropriate number card, writing on an individual chalkboard or dry erase board, connecting the correct number of linking cubes, or writing in a math journal.

Review the final answer to each problem by having a volunteer explain how he or she calculated each step. Ask the rest of the class to give a thumbs-up sign if they think a calculation is correct. Write correct calculations on the chalkboard for clarification or reinforcement. Show children the most effective way to group or break down numbers for problems. Have children compare and contrast different calculations to find the quickest way to get the correct answer.



Assessment

The best way to assess children's skill level and their comprehension of each problem is to carefully observe their reactions. Watch to see who hesitates and who quickly responds. Note children's reactions when they whisper answers to each other.

A math journal is another way to assess mental math ability. Staple several sheets of blank paper inside a construction paper cover to create a mental math journal for each child. Once a week, have children write in their journal their answers and an explanation of how they calculated each answer

(in place of having volunteers explain their calculations). Use the Record Chart (page 8) to keep track of individual progress. Review each child's journal, and write a check under the corresponding concept(s) for each problem the child answered correctly.

Use the math journals and the data from the record chart to determine if a child uses effective calculation methods. Present mini-lessons on specific math concepts to individual children or small groups.



Math Concepts

Mental math problems incorporate a variety of math concepts. The following list provides a definition of each concept and the ways in which it appears in this book. Use the parenthetical reference to locate where each concept first appears.

Addition: Find the total number of items when two groups of items are combined. Children solve single- and double-digit addition problems. (#6, page 12)

Calendar: Demonstrate knowledge of periods of time. (#20, page 19)

Division: Find the number of times a group contains a given subgroup. Children solve single-digit division problems. (#106, page 62)

Money: Demonstrate knowledge of the value of coins and one dollar. (#9, page 14)

Multiplication: Calculate the total number of items consisting of equal groups. Children double numbers up to 8 and solve single-digit multiplication problems. (#64, page 41)

Number Pattern: Recognize underlying patterns in the number system. (#15, page 17)

Number Sequence: Identify the order or compare values of two numbers. (#1, page 10)

Place Value: Determine the value of a digit by its position within a number. (#69, page 44)

Rounding Numbers: Find the nearest whole number or given place value. (#59, page 39)

Shapes: Demonstrate knowledge of the properties of a named polygon. (#25, page 22)

Subtraction: Compare two groups and find the difference, or find what is left when one group is taken from another. Children solve single- and double-digit subtraction problems. (#7, page 13)

Time: Calculate time to the half hour and hour. (#27, page 23)



Mental Math Extensions

There are so many fun ways to use *Mental Math*. The following individual, small-group, and whole-group activities feature a variety of ways to use the mental math cards.

- Give two children 14 mental math cards. Ask one child to shuffle and deal all of the cards. Have children alternate reading their cards to their partner. If their partner calculates the problem correctly, have the reader give that card to his or her partner. If their partner is incorrect, have the reader discard the card. Encourage children to try to collect more cards each time they repeat the game.



- Select a class set of mental math cards. Divide the class into two teams. Call one player from each team to the front of the class, and place a bell in front of each player. Read a mental math card. The first player to ring the bell and give the correct answer earns a point for his or her team. If the first player gives an incorrect answer, invite the other player to respond. Continue the game with two new players and a new mental math card until each child has had two turns. Applaud both teams when the last card has been played.

- Place 30 mental math cards at a learning center. Give each child at the center a Game Sheet (page 9) and pencil. Ask one child in the group to shuffle the cards and place them in a pile. Have children take turns reading a card while the remaining group members record the mental math card number in the *Card #* column and their answer in the *Answer*



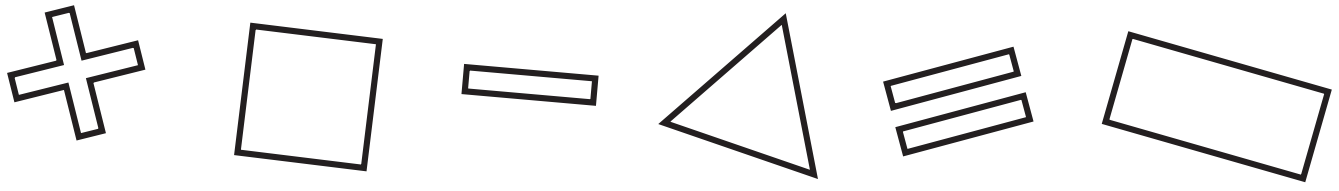
column of their game sheet. Have the reader check the players' answers. Invite children to record one point in the *Points* column next to each correct answer. The child with the most points wins the game.

- Ask children to write their own mental math problems. Challenge children to write at least two steps in their problems. Review the problems for accuracy, and then share them with the class.



Game Sheet

Card #	Answer	Points	Card #	Answer	Points	Card #	Answer	Points



MENTAL MATH

1

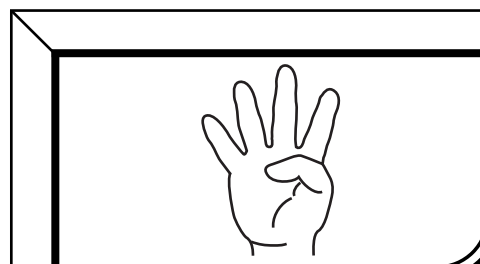
Start with the number 3. (3)

Think of the next number. (4)

Show me your answer with your fingers. (4)



Math Concept: number sequence



MENTAL MATH

2

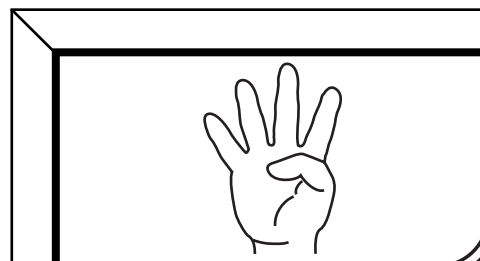
Start with the number 2. (2)

Think of the next two numbers. (3, 4)

Show me the greater number with your fingers. (4)



Math Concept: number sequence



MENTAL MATH

3

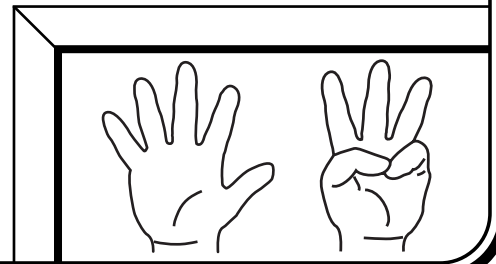
Start with the number 5. (5)

Think of the next three numbers. (6, 7, 8)

Show me the greatest number with your fingers. (8)



Math Concept: number sequence



MENTAL MATH

4

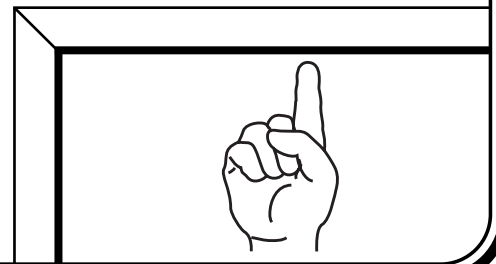
Start with the number 2. (2)

Think of the number that comes before 2. (1)

Show me your answer with your fingers. (1)



Math Concept: number sequence



MENTAL MATH

5

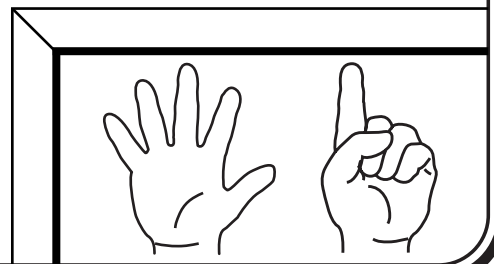
Start with the number 8. (8)

Think of the number that comes two numbers before 8. (6)

Show me your answer with your fingers. (6)



Math Concept: number sequence



MENTAL MATH

6

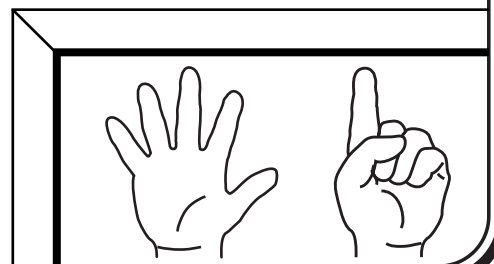
Start with the number 2. (2)

Add 4. (6)

Show me your answer with your fingers. (6)



Math Concept: addition



MENTAL MATH

7

Start with the number 6. (6)

Subtract 2. (4)

Show me your answer with your fingers. (4)



Math Concept: subtraction



MENTAL MATH

8

Start with the number 6. (6)

Subtract 4. (2)

Show me your answer with your fingers. (2)



Math Concept: subtraction



MENTAL MATH

9

Start with the value of three pennies. (3¢)

Add the value of two pennies. (5¢)

Whisper your answer to your neighbor. (5¢)



Math Concepts: money, addition

5¢

MENTAL MATH

10

Start with the value of one nickel. (5¢)

Subtract the value of two pennies. (3¢)

Whisper your answer to your neighbor. (3¢)



Math Concepts: money, subtraction

3¢