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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 students to practice mental calculations as well as improve their math, listening, problem-solving, and communication skills. Students learn and store math facts and operations during each mental calculation and apply this knowledge to the solution of new problems.

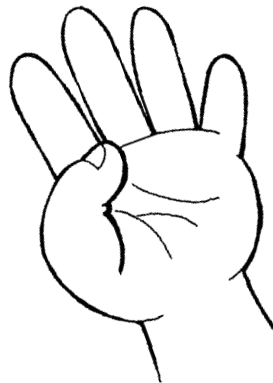
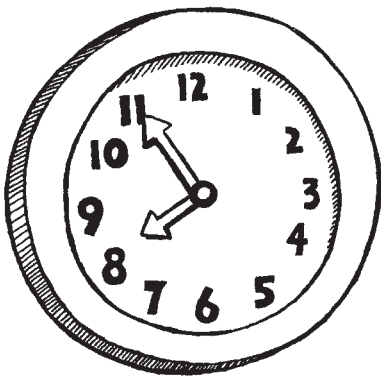
Mental math problems are a great way to start your class's day. Use them to help students focus, listen, and warm up. Need to fill a few minutes in your daily schedule? The problems in *Mental Math* also make perfect “sponge” activities. Adapt the problems to meet your unique instructional needs and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



Getting Started

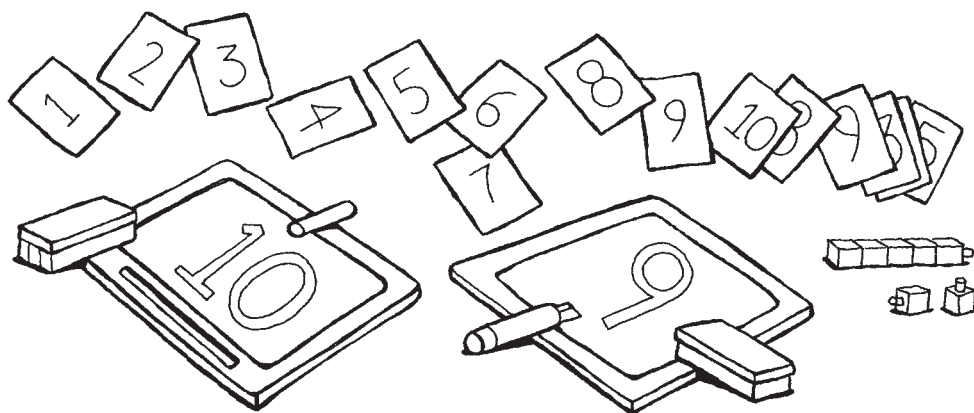
Introduce mental math problems at the beginning of the year. Use them to build on current math concepts. Start by photocopying and cutting apart the reproducible mental math cards. Read each problem in advance to make sure students are familiar with the math concept(s), skill(s), and interdisciplinary 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 students.

Read a mental math problem to the class. Give students 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 students are struggling

with mental calculations, ask them to show their answer for each step (rather than just their final answer).

The problems in *Mental Math* direct students to whisper their answer to their neighbor or show it on their fingers. However, feel free to modify the directions to have students answer problems by showing the appropriate number card, writing on an individual chalkboard or dry erase board, 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 students the most effective way to group or break down numbers for problems. Have students compare and contrast different calculations to find the quickest way to get the correct answer.



Assessment

The best way to assess students' skill level and their comprehension of each problem is to carefully observe their reactions. Watch to see who hesitates and who quickly responds. Note students' 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 student. Once a week, have students 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 student's journal, and write a check under the corresponding concept(s) for each problem the student answered correctly.

Use the math journals and the data from the record chart to determine if a student uses effective calculation methods. Present mini-lessons on specific math concepts to individual students 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. Students solve one- to four-digit addition problems. (#1, page 10)

Calendar: Demonstrate knowledge of periods of time. (#1, page 10)

Decimals: Solve a problem with decimals. Students add, subtract, multiply, and divide decimals and determine the decimal equivalent of a fraction. (#47, page 33)

Division: Find the number of times a group contains a given subgroup. Students solve double- and triple-digit division problems and calculate square roots, percentages, and halves. (#4, page 11)

Fractions: Find a part of a whole. Students add and subtract fractions; determine the value of a fraction of a number; and determine the fractional equivalent of a decimal or percent. (#6, page 12)

Money: Demonstrate knowledge of the value of coins and dollars. (#4, page 11)

Multiplication: Calculate the total number of items consisting of equal groups. Students solve one- to four-digit multiplication problems; double, triple, and square numbers; multiply by ten and exponents of ten; and solve exponential problems. (#1, page 10)

Number Sequence: Identify the order or compare values of two numbers. (#7, page 13)

Place Value: Determine the value of a digit by its position within a number. (#3, page 11)

Rounding Numbers: Find the nearest whole number or given place value. (#2, page 10)

Shapes: Demonstrate knowledge of the properties of a named polygon. (#7, page 13)

Subtraction: Compare two groups and find the difference, or find what is left when one group is taken from another. Students solve one- to four-digit subtraction problems. (#4, page 11)

Time: Calculate time to the minute, quarter hour, half hour, and hour. (#20, page 19)

Vocabulary: Identify and use math vocabulary (e.g., prime, factor, mean) to solve problems. (#8, page 13)



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 students 14 mental math cards. Ask one student to shuffle and deal all of the cards. Have students 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 students 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 student 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 student at the center a Game Sheet (page 9) and pencil. Ask one student in the group to shuffle the cards and place them in a pile. Have students 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



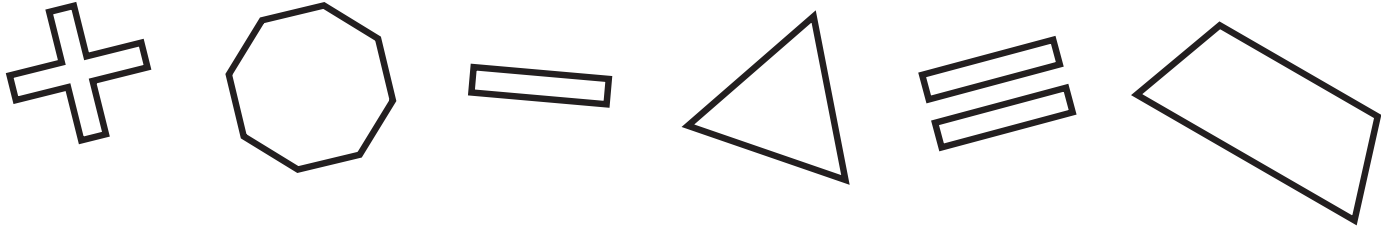
Answer column of their game sheet. Have the reader check the players' answers. Invite students to record one point in the *Points* column next to each correct answer. The student with the most points wins the game.

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



Game Sheet

Card #	Answer	Points	Card #	Answer	Points



MENTAL MATH

1

Start with the number of days in one week. (7)

Double that number. (14)

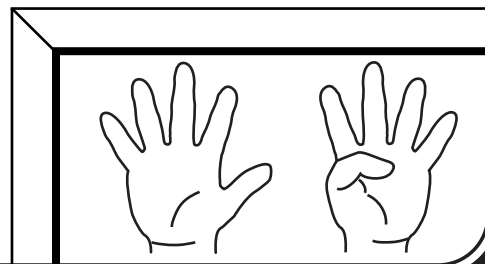
Add the digits together. (5)

Add 4. (9)

Show me your answer with your fingers. (9)



Math Concepts: calendar, multiplication, addition



MENTAL MATH

2

Start with the number 9. (9)

Double that number. (18)

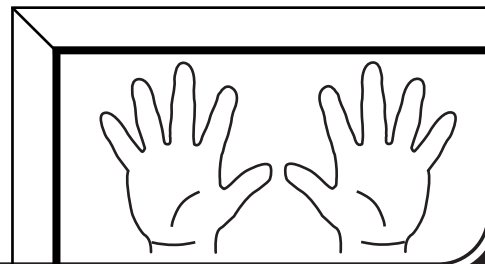
Add the digits together. (9)

Round that number to the nearest ten. (10)

Show me your answer with your fingers. (10)



Math Concepts: multiplication, addition, rounding numbers



MENTAL MATH

3

Start with the number 12. (12)

Round that number to the nearest ten. (10)

Double that number. (20)

Multiply the digit in the ones place by the digit in the tens place. (0)

Whisper your answer to your neighbor. (0)



Math Concepts: rounding numbers, multiplication, place value

0

MENTAL MATH

4

Start with the number of days you are in school each week. (5)

Double that number. (10)

Subtract the number of pennies in one nickel. (5)

Divide that number by the number of nickels in one quarter (1)

Show me your answer with your fingers. (1)



Math Concepts: calendar, multiplication, subtraction, money, division



MENTAL MATH

5

Start with the number 12. (12)

Double that number. (24)

Add the digits together. (6)

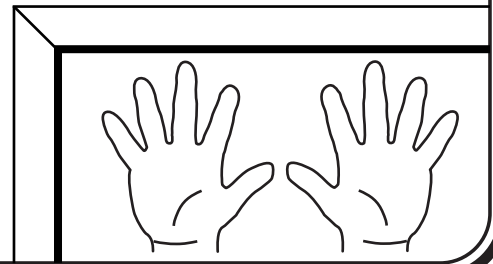
Multiply that number by 3. (18)

Subtract the number of dimes in 80 cents. (10)

Show me your answer with your fingers. (10)



Math Concepts: multiplication, addition, subtraction, money



MENTAL MATH

6

Start with the number 32. (32)

Add the digits together. (5)

Add 1. (6)

Subtract $\frac{3}{4}$. ($5\frac{1}{4}$)

Whisper your answer to your neighbor. ($5\frac{1}{4}$)



Math Concepts: addition, subtraction, fractions

