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Sample Pages From

*Exploring Math: An Intervention &
Reinforcement Resource
Level E*



Teacher Resource Guide

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PUBLISHING

Introduction

Exploring Math: An Intervention and Reinforcement Resource is a mathematics program that offers intervention and reinforcement opportunities in key areas of the math curriculum. This program can be used for summer school, after school and tutoring programs, or to support a year-long mathematics program.

Each kit includes:

- Teacher Resource Guide
- 7 units of lessons, with each unit focused on a specific set of content and process skills
- 7 Problem-Solving Strategy Cards, to be used with problem-solving lessons in the units
- 14 Real-Life Problem-Solving Cards, to be used with problem-solving lessons in the units
- 14 Skill Application Games to reinforce skills introduced in unit lessons
- CD-ROM with downloadable practice pages, tests, problem-solving and strategy cards, reproducibles, and *PowerPoint® Lessons*
- 42 transparencies of problem-solving and strategy cards, for use with problem-solving lessons

Teacher Resource Guide

The guide provides the teacher with a variety of tools and information to use with the materials in this kit. It is divided into these sections:

- ✓ Introduction
- ✓ Management (includes standards correlations and a listing of objectives for each unit)
- ✓ Placement Test
- ✓ Problem-Solving Strategies
- ✓ Skill Application Games
- ✓ Glossary (a teacher/student guide to terms commonly used in the units)

The units in this kit contain specific, sequential lessons by topic and are divided into units that target the following content goals and processes:

- Numbers & Numeration
- Operations & Computation
- Fractions
- Geometry
- Measurement
- Data Analysis
- Problem Solving
- Algebraic Thinking
- Mathematical Reasoning

Introduction

About the Units

Each unit is organized as follows:

Table of Contents and Introductory Pages

Lessons

- Teacher Lesson
- Student Page(s)
- Pre-Test/Post-Test Page

Answer Keys

- Keys for Student Pages
- Keys for Pre-Tests/Post-Tests

Reproducible Pages

- Commonly Used Reference Pages

Every unit in the *Exploring Math* kit contains the lessons, student activity pages, pre-tests and post-tests, answer keys, and reproducibles for the unit. Since the units are self-contained and topic-specific, they are also ideal for use as replacement units in the classroom.

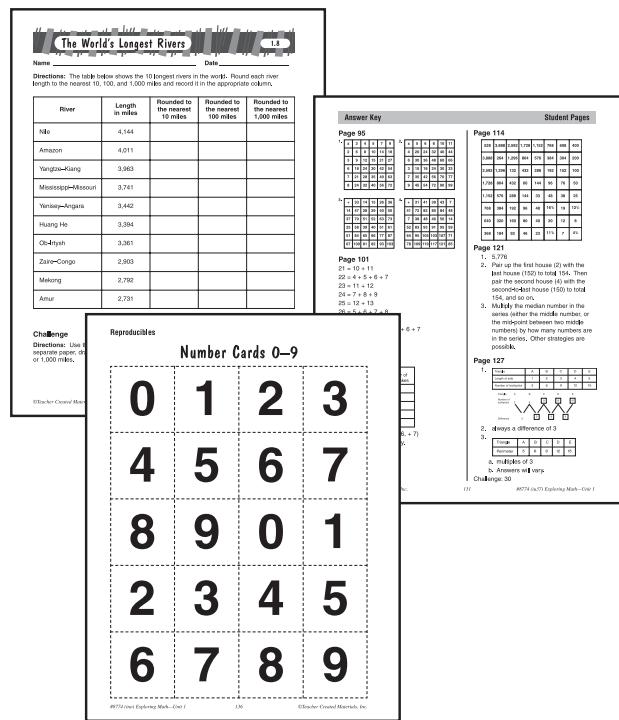
Note: With each lesson, the teacher has the option of choosing from two forms of presentations. The first method is to use the lessons as written in the unit. For those who wish to use an alternative method, we have provided PowerPoint® slide shows that meet the same lesson objectives, and include warm-up activities and the main lesson as well. A thumbnail copy of the PowerPoint® slides is included in the lessons, and each PowerPoint® lesson presentation can be found on the CD-ROM.

The administration of Pre-Tests and Post-Tests provides a method of assessing student achievement. Pre-Tests should be given prior to each lesson, to assist the teacher in determining classroom needs. Forms for recording test scores for each student can be found at the beginning section of each unit.

Answer keys for both the student pages and the Pre-Tests and Post-Tests are located within each unit. The student page answer keys are presented first, followed by the test answer keys.

The last section of each unit contains reproducible pages that may be commonly used throughout the unit. Material on some of the pages is used as manipulatives. Other pages provide reference information for the students.

The following pages provide additional details of the lesson content and organization.



Introduction

About the Units: Lesson Organization

The lesson is identified by number. The first number is the unit, the second number represents the lesson.

Each lesson identifies the topic area or skill to be covered in the lesson.

A visual representation of the lesson tests, student pages, and reproducibles is provided.

Focused learning objectives are identified. A standards correlations chart, located in the Teacher Resource Guide, matches lesson objectives to national standards.

Lesson 1.3

Place Value and Ordering Numbers

Learning Objectives

- ✓ Use place value to sort numbers into ascending order.
- ✓ Read and write numbers with seven digits or less.

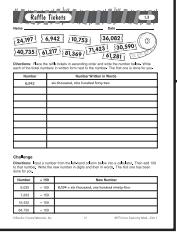
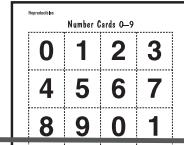
Resources

- Number Cards 0–9 (page 136)
- calculators
- “Raffle Tickets” (page 31)
- Pre-Test/Post-Test (page 32)

Unit
1



The clock indicates approximate time for the activity. Times are provided for the Warm-Up Activity, the Whole-Class Skills Lesson, and the Differentiated-Group Skills Practice activities.



Lessons identify specific resources, including any reproducibles and/or suggested classroom manipulatives, as needed to teach the lesson.

The Warm-Up Activity reinforces mental math and number skills and actively engages students prior to the lesson. Activities help develop students' abilities to think mathematically. Content may or may not link directly to the main body of the lesson.

Note: As with the main lesson and group work, the alternative *PowerPoint®* warm-up lesson can replace this written lesson.

Note: For *PowerPoint®* lesson options, arrange for the necessary equipment in advance.

Introduction

About the Units: Lesson Organization

This is the whole-class or whole-group section of the lesson. The interactive lesson focuses on the skills listed in the learning objectives. The text includes questions to ask the students and examples that reinforce the skills being taught. The Whole-Class Skills Lesson is a suggested plan for teaching the objectives. You can adapt the contents to meet the needs of your students.

Reminders about Pre-Test administration and preparation for Differentiated-Group Skills Practice activities are provided.

Unit 1

Place Value and Ordering Numbers

Lesson 1.3

Whole-Class Skills Lesson

If the Pre-Test (page 32) has not yet been given, administer it at this time. (See pages 8–11 for testing information.)

Prepare to group students for the Differentiated-Group Skills Practice which follows the Whole-Class Lesson.

Use the directions below, or the *PowerPoint®* presentation (see *PowerPoint®* Lesson Option preview, page 30), to teach this lesson.

1. Tell students, “Today we will be arranging numbers in sequential order by looking at the place value of the digits.”

2. Write three, three-digit numbers on the board, and demonstrate how to write them in ascending order looking at the number in the hundreds place first, then the tens, and finally the ones. (Discuss the term *ascending*, using examples from real life, such as ascending a mountain or staircase.)

3. Show students how to use the method described in step 2 to order four- and five-digit numbers.

4. Give students some examples of ordering numbers where one or more of the digits are the same and require them to look further at the place value.

Examples: 7(2)1 7(4)2 7(1)5
ascending order: 715; 721; 742

4.(6)5 2 4.(7)9 1 4.(6)3 8
ascending order: 4,638; 4,652; 4,791

5. Continue practicing this method with additional examples like the ones above.

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PowerPoint®
Lesson Option
information is
listed here.

The text is numbered, providing easy-to-follow steps as the lesson is presented.

Introduction

About the Units: Lesson Organization

Use the differentiated-group practice suggestions to reinforce the skills taught in the lesson. Groups can be determined by pre-test results and/or general understanding of the concepts and skills introduced in the lesson. The Differentiated-Group Skills Practice portion of the lesson provides an opportunity for more focused learning and addresses the various ability levels within the class.

The symbols indicate levels of difficulty (On Level, Below Level, Above Level).

Suggestions for the Lesson Review are included.

They provide an opportunity for group discussion and reflection.

Place Value and Ordering Numbers

Lesson 1.3

Unit 1

Differentiated-Group Skills Practice

Above Level – Teacher Directed

- Have students explore place value up to millions. Read aloud a seven-digit number, and have them write the number.
- Ask students to identify what each digit represents and also to solve number sentences such as the following:
 $1,264,521 = 1,000,000 + 200,000 + \underline{\hspace{2cm}} + 4,000 + 500 + 20 + 1$
- Instruct students to use number cards 0–9 to make the largest and smallest seven-digit numbers possible, and then write the numbers in both digits and words. Once finished, ask students to complete the activity sheet independently.

Below Level – Teacher/Student Directed

- Have students choose three number cards 0–9. Tell them to arrange the three cards to make as many three-digit numbers as they can and write the numbers on a piece of paper.
- Have students write the numbers in ascending order.
- Let students choose three different number cards and repeat the process. Have students complete the activity sheet in pairs.

On Level – Student Directed

- Students should complete the activity sheet independently.

Lesson Review

Reinforce how to sort numbers into ascending order by writing several numbers on the board. Tell students to write them in order on a piece of paper. Review the answers together.

Extension

Extend the lesson by instructing students to use all of the number cards 0–9 (page 136) to make two five-digit numbers that have the smallest difference. (90, 123 – 87, 654)

Additional Extension Resources:

- CD-ROM Practice Pages: 2, 13, 17, and 25

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Administer the Post-Test (page 32) at this time.
(See pages 8–11 for testing information.)

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A Post-Test reminder is included. Use test results to assess students' understanding of the skills and concepts introduced in the lesson.

Check here for any related practice pages from the CD-ROM and/or Skill Application Game cards that reinforce some of the skills taught in the lesson.

Some group activities are facilitated by the teacher, while other group practice is assigned as small group or independent work. The method of presentation is noted within the text.

These optional activities may include a homework assignment or activity that challenges students to extend their thinking.

Introduction

About the Units: Lesson Organization

With the exception of the two strategy-based problem-solving lessons, the teacher has the option of choosing from two forms of presentation. The first method is to use the lesson as written in the unit. For those who wish to use an alternative method, we have provided *PowerPoint®* slide shows that meet the same lesson objectives. If you decide to use the *PowerPoint®* Lesson Option, keep in mind that you will need the same resources and general preparation as in the written lesson.

PowerPoint® Lesson Option

Lesson
1.3

Today's Lesson		
Place Value and Ordering Numbers		
438 421 426 Order these numbers. Look first at the hundreds digit. Each number has a 4 in this column.	438 421 426 Now, look at the tens digit. We can start to order the numbers. 426 421 438	Remember to count in thousands together. Here are the starting numbers. 5,625 9,214 63,425 96,342
256 272 252 Order these numbers. Smallest Largest 252 256 272	356 472 372 Order these numbers. Smallest Largest 356 372 472	Finally, use the ones column to order your numbers. 426 421 438 421 426 438
9,791 9,971 9,719 Order these numbers. Smallest Largest 9,719 9,791 9,971	78,719 74,971 79,971 Order these numbers. Smallest Largest 74,971 78,719 79,971	Remember to order three-digit numbers by looking at the hundreds column, then the tens column, then the ones column. 5,791 5,652 5,638 5,638 5,652 5,791
62,418 62,148 62,841 Order these numbers. Smallest Largest 62,148 62,418 62,841	3,791 3,692 3,638 Order these numbers. Smallest Largest 3,638 3,692 3,791	Top Tip Remember to order three-digit numbers by looking at the hundreds column, then the tens column, then the ones column.
Group Practice Identify each digit in a seven-digit number. Practice ordering three-digit numbers. Practice writing four- and five-digit numbers in words.		

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The slides present only the Warm-Up Activity and Whole-Class Skills Lesson components.

The slide presentation meets the common objective(s) of the lesson, but the content and examples are not exact duplicates of the written lesson. It is an alternative plan for teaching the warm ups and main lessons.

Suggestion: If the written lesson has been given and students need further review, consider using the *PowerPoint®* Lesson Option as additional reinforcement.

Once you have completed the Warm-Up Activity and the Whole-Class Skills Lesson slides, you are directed to the group practice activities. The last slide indicates what each group will focus on as they practice and reinforce the skills learned in the main lesson. This is only an introduction to the activities. For group details, see the information provided in the Differentiated-Group Skills Practice section of the written lesson.

Following the group practice activities, continue as you would with the written lesson by completing the Lesson Review, administering the Post-Test, and introducing the optional Extension activities.

Introduction

About the Units: Problem-Solving Lessons

□ Problem-Solving Strategies and the Real World

The unit lessons reinforce a variety of content and process skills. (A sample Problem-Solving Lesson is provided on pages 12–15.) In an effort to improve students' problem-solving skills, specific problem-solving lessons have been included in each unit. The lessons introduce students to problem-solving situations in a more real-life setting. As students work through the problems in the Problem-Solving Lessons, they begin to see problem solving as a process. In addition, students are equipped with specific strategies that can help them successfully find solutions to otherwise difficult problems.

- ✓ Detailed information about the 12 strategies used in *Exploring Math* can be found in the Problem-Solving Strategies section of this guide. Each of the seven units in the kit focuses on one of these strategies.

In each unit you will find two comprehensive problem-solving lessons. Students are given real-life problem-solving situations and asked to find a solution using a specific strategy.

In order to teach a problem-solving lesson, you will need a Problem-Solving Strategy Card and a Real-Life Problem-Solving Card. These are found in the card section of the kit and are color-coded and labeled by unit. The lesson "Resources" specify the cards to be used. Overhead transparencies for both sets of cards are also available in the kit. Copies of both sets of cards can be downloaded from the CD-ROM, located in the Teacher Resource Guide. Specific directions for using the transparencies and cards are provided within the lessons.

□ About the Problem-Solving Lesson

Strategy

The lesson begins with an introduction to the strategy. The sample Strategy Card shown here introduces and models the Drawing a Table strategy that will be used in the lesson.

The lesson plan provides step-by-step directions for teaching this strategy.

Unit
1
Problem-Solving Strategy Card

Drawing a Table

When a problem has lots of information, placing the information in a table is a good idea. A table helps you organize the information so that it can be easily understood.

A table makes it easy to see what information is there, and what information is missing. When a table is drawn, it is easier to see if there is a pattern, or part of a solution, which can then be completed.

You will usually have to create some of the information in order to complete the table and then solve the problem.

Using a table can help reduce the chance of making mistakes or repeating calculations.

It is almost always easy to decide how to divide up the information in the problem or make a table that works with the information. With practice, you will learn how to use a table to solve problems.

Before you begin using tables, read the following information to learn more about how and when to use tables to solve problems.

Deciding on the Number of Columns and Rows

- * First, decide how many pieces of information are included in the problem.
- * Next, think about how many columns needs to be in a row or a column. Be aware that you understand what the table is going to tell you.
- * Headings are also important because they show the word contexts of the table.

Example: Research shows that three out of every 10 people have blonde hair. How many blonde can be found among 1,000 people? For this problem, you need to make a table with two columns: Number of People and Number of People.

Number of People	Number of People
3	10
30	100
300	1,000

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SIDE A

STRATEGY: DRAWING A TABLE
Unit 1—Side B
Problem-Solving Strategy Card

Using the Strategy

Sample Problem: A group of students is working a long poem for a school assembly. Each week they are taught a certain number of verses. The first week they learn one verse, and by the end of the second week, five verses. At the end of the third week, the students can recite six verses. At the end of the fourth week, they learn two more. How many verses would they be able to recite after eight weeks?

UNDERSTANDING THE PROBLEM
In the first week, students learn one verse. At the end of the second week, they know three verses. At the end of the third week, they know six verses. By the end of the fourth week, they know ten verses. What do we need to find out? How many verses do they know after eight weeks?

PLANNING AND COMMUNICATING A SOLUTION
To solve this problem, draw a table with 21 rows and 2 columns (or 3 columns and 8 rows). The first row should list the week number (1–8). The second row should list the number of verses.

EXTENSION
What if the students were not able to practice for one or two weeks?
How would this change the results?

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SIDE B

Introduction

About the Units: Problem-Solving Lessons (cont.)

About the Problem-Solving Lesson

Applying the Strategy

Once the strategy is introduced and reviewed, the teacher is ready to proceed with the application part of the lesson. The Real-Life Problem-Solving Card is used for the remainder of the lesson. Each card in the kit presents a real-life problem. The lesson in the unit guides students through specific steps for solving the problem using the strategy introduced earlier in the lesson.

The front of the card (Side A, page 11) presents a topic of interest that relates to real life. The information is used to solve the problems on the back of the card.

The back of the card (Side B, page 11) connects a problem to the information on the front of the card. A unique feature of the Problem-Solving Lessons and Cards is the approach to creating and solving the problems presented on the Real-Life Problem-Solving Card. The teacher can assign each of the three problems to a specific group of students, depending on the students' ability levels.

Three problems are given:

- **Problem A—Below Level** (Lowest level of difficulty)
- **Problem B—On Level** (Average level of difficulty)
- **Problem C—Above Level** (Highest level of difficulty)

The problems use the same information given on the Real-Life Problem-Solving Cards and the same strategy introduced in the lesson. The problem-solving lessons guide the teacher through the process of using the Strategy Cards and Real-Life Problem-Solving Cards with the lessons. The teacher is also provided with specific details for helping the individual groups solve their problems, using the strategy they learned. Directions are given for problems A, B, and C.

✓ Note: The Problem-Solving Lessons were created using a differentiated approach. However, it is not necessary to assign all three problems as outlined in the lesson in order to successfully teach the strategy and reinforce the problem-solving process. If you choose not to group students, choose one of the problems (A, B, or C) and use the parts of the lesson that refer to that particular problem.

Introduction

About the Skill Application Games

□ Reinforcing Skills

A set of 14 game cards is provided. These full-color cards are ideal for centers and small-group interaction. The cards are coordinated with the lesson units. They reinforce several skills taught within each unit. Many cards are designed to make math content “real” to students by providing a real-life setting, or a content area connection. Each card includes student directions as well as reproducible page information. For information about the games, see the Management and Skill Application Games sections of this guide.

About the CD-ROM

□ A Source for Printable Materials

A CD-ROM is included in the back of this guide. It contains the following materials:

- **Placement Tests** from Units 1–7
- **Pre-Test and Post-Test** pages from Units 1–7
- **Student Activity Pages** from Units 1–7
- **Skill Application Games** (student directions and related reproducible information)
- **Problem-Solving Strategy Cards**
- **Real-Life Problem-Solving Cards**
- **PowerPoint® Lesson Options** (slide presentations) for all unit lessons (The *PowerPoint®* lesson offers an alternative method for teaching the Warm-Up Activity and the Whole-Class Skills Lesson, as well as a listing of Differentiated-Group Skills Practice activities for the lesson.)
- **Reproducibles** from the last section of each unit
- **Additional Practice Pages** (Over 100 pages of student practice to reinforce basic skills are introduced in each of the units. Answer keys are included.)
- **Glossary** from Teacher Resource Guide

Note: The printable pages on this CD-ROM allow you to download and print copies of the materials listed above. Simple directions for using the CD-ROM are presented in the READ ME files.

Management

Exploring Math: Intervention and Reinforcement Resource allows the teacher to focus on math topics in which students need additional reinforcement. It is especially important in intervention and other support programs to determine areas of greatest need as soon as possible.

→ Getting Started: Placement Tests

The first step in using the materials in this kit is to administer the Placement Test. The results will help you evaluate your students' skill levels in each of the units in the kit. We have provided a placement test in this guide (pages 47–67) that should be administered prior to formal instruction. The placement test consists of 15 items for each unit in the kit. Test items are representative of the units' content, and have been named Unit 1, Unit 2, Unit 3, and so on, to correlate with the unit guides.

Reproduce a copy of the test for each student. Students can write on the copy (circling the appropriate answer choices), or the test copy can be used for reading only, and students can use the bubble-in test

answer sheets found on pages 68 and 69. In either case, students should show their work on the test, or on separate paper. An Answer Key is provided on page 70.

Placement Test
Unit 1

Name: _____ Date: _____

The questions on the following pages will help you and your teacher find out which math skills you are already good at and which ones you need to work on.

To help you do your best, remember to do the following:

- Read the questions and answer choices carefully.
- Circle the letter that shows the answer you have chosen. If your teacher provides you with an answer sheet, fill in the circle next to the correct answer on the answer sheet.)
- Show your work in the question box. Use another sheet of paper if you need more room.
- Try completing all questions.

1 Mount Everest is twenty-nine thousand, thirty-five feet tall. Which number shows this height?
A. 2,935
B. 29,350
C. 29,035
D. 290,035

2 What is the written expression for $16,342 + 127$?
F. sixteen thousand, four hundred, sixty-nine
G. sixteen thousand, four hundred, seventy-nine
H. fifteen thousand, five hundred, sixty-nine
J. fourteen thousand, four hundred, sixty-nine

3 Which number shows the numbers in order from least to greatest?
A. 9,556 9,565 9,655 9,491
B. 9,565 9,655 9,491 9,556
C. 9,556 9,655 9,565 9,491
D. 9,491 9,556 9,565 9,655

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You may wish to administer the test in two or three sessions. This allows time for scoring between test-taking sessions. A Placement Test Class Record is available on pages 71 and 72. Record student names and test results on this form for an overview of class test results. After a test is scored, write in the number of correct responses for each student in the appropriate columns. For example, if Johanna scored 11 out of 15 correct on the Multiplication and Division test items, write in “11” in the top section of the scoring box for that unit.

When all sections of the test have been administered, and the students' scores are recorded, review the test score record

form. First, find the mean scores for each unit by averaging the columns and writing the average at the bottom of each column. The results will provide you with an overview of the students' overall performance and help you prioritize the unit(s) that need the most reinforcement. If mean scores are similar, and the overall results are fairly equal, plan to start with the math topic that is generally most essential to your math curriculum needs.

Evaluation of the placement test results will help you establish the unit(s) on which to focus attention. If, for example, students score lowest on a set of multiplication and division items in the placement test, you should consider the Multiplication and Division unit a priority. See pages 25–27 for pacing plans.

Management

= Getting Started: Placement Tests (cont.)

It is recommended that you keep a file for each student, in which to store Placement Tests, Pre-Tests and Post-Tests, and other documentation of progress the student is making as he or she moves through the unit(s) in the kit.

= Using the Lessons

After the placement test scores have been recorded and reviewed, select the unit(s) you feel needs the most reinforcement. Look over the information in the written lessons or the *PowerPoint®* lesson presentations.

Tests

Before you start a lesson, give the students the Pre-Test for that lesson. The Pre-Test can be administered at the end of a previous lesson, at the beginning of the day, or at some other point in your schedule that will allow you time to score it. Because the test is short, scoring time is minimal. (Information on the tests, preparing individual student files, and recordkeeping forms are provided on pages 8–11 of each unit.)

To prepare the tests, reproduce copies of each for the students. Cut the copies in half along the dashed line, separating the Pre-Tests from the Post-Tests. Store the tests until needed. (Copy all the unit tests at once in this way, or only prepare a few units at a time.)

Use Pre-Test results to evaluate students' needs as they relate to the content of the lesson, and to determine your student groups during the Differentiated-Group Skills Practice portion of the lesson. Since there will inevitably be variations in ability within each group, some flexibility is advised in assigning group work. However, the Pre-Tests can serve as a tool for determining initial grouping for the lesson.

Overall assessment of each student's progress can be checked with the Post-Test, administered at the end of the lesson. Record scores on the recordkeeping form provided in each of the units.

Student Test Record			Name _____		
Unit 1			Learning Objectives		
Lesson	Learning Objectives		Test Scores	Group	
	Pre	Post	Pre	Post	Group
1.1	Read and write numbers with seven digits or less. Identify the place value of each digit.		3 / 3	3 / 3	
1.2	Read and write numbers to the millions place. Identify the place value of each digit of a number to the millions place.		3 / 3	3 / 3	
1.3	Use place value to sort numbers into ascending order. Read and write numbers with seven digits or less.		3 / 3	3 / 3	
1.4	Recognize negative numbers. Order a set of positive and negative numbers.		3 / 3	3 / 3	
1.5	Use a number line to add and subtract negative numbers. Order a set of integers from least to greatest. Generate numbers and arrange them in order from least to greatest.		3 / 3	3 / 3	
1.6	Round a number to the nearest 10, 100, and 1,000. Estimate to find an approximate number.		3 / 3	3 / 3	
1.7	Use rounding to calculate an estimation. Estimate to find an approximate answer. Recognize number sequences and extend them.		3 / 3	3 / 3	
1.8	Round a number to the nearest 10, 100, or 1,000. Round measurements in miles to the nearest 10, 100, or 1,000.		3 / 3	3 / 3	
1.9	Estimate to find an approximate number. Round a number to the nearest 10, 100, or 1,000.		3 / 3	3 / 3	
1.10	Test positive numbers for divisibility. Identify prime numbers.		3 / 3	3 / 3	

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Unit Organization and Resources

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Management

→ **Using the Lessons** (*cont.*)

Moving Through the Lesson

Each lesson begins with a set of **Learning Objectives** to be used as the teaching focus. (For correlations of the lessons to NCTM standards, see pages 30–36.)

Look over the **Resources** section to be sure all materials are prepared and ready in advance. Most resources listed are readily available, or easily acquired. Materials such as game markers, dice, objects for counting, interlocking cubes, scales, blank index cards, and measuring tools should be collected and stored in containers for easy access. Reproducible pages including manipulatives, charts, or other reference materials commonly used throughout the unit can be found in the last section of the unit.

Copy the pages as needed prior to the lesson. Start the lesson with the **Warm-Up Activity**. Although the Whole-Class Skills Lesson can be taught independently, the Warm-Up Activity provides an opportunity for students to exercise and reinforce their mental math skills on a daily basis. (The improvement of mental math skills through continuous practice is built into this program.) The warm-up exercises are designed to “get students thinking” mathematically before the main lesson.

The main lesson includes the **Whole-Class Skills Lesson** and the **Differentiated-Group Skills Practice**. Although specific questions, information, and examples have been provided, you are not limited to the content. Add to the lesson as the students’ needs dictate, and use the “teachable moment” whenever possible. When the main lesson is completed, assign group work as indicated by the symbols shown on the lesson page.

The **Differentiated-Group Skills Practice** section allows students to practice the skills learned in the lesson. Distribute any materials noted in this section to the groups you have assigned. Use the directions provided to guide students through the activities.

The group work assignments are usually related directly to the student pages, which follow the lessons. Review with each group the tasks they are to complete, to be sure all students understand the assignment. Since you will usually work with one of the groups during this time, discuss the assignment and expectations with the other groups first. Establish what each group is to do upon completion of work (hand in assignment, check work together, share responses and solutions during Lesson Review, etc.).

The **Lesson Review** brings closure to the day’s lesson and the group work. In addition to reinforcing the lesson and its objectives, this review time allows students to respond to specific questions and to discuss their group work activities. Feedback regarding what the students learned, and a discussion of problems they may have encountered, is encouraged at this time.

Management

— Using the Lessons (cont.)

Moving Through the Lesson (cont.)

An **Extension** is included in each lesson. This activity provides an opportunity for students to apply what they learned to new situations. Extensions often consist of a series of questions that lead students to think beyond the parameters of the lesson. Many of the lesson extensions can be assigned as homework. In addition, they bring math into a real-world setting. For example, to apply the use of math operations to the measurement of length, students may be asked to measure the dimensions of their bedrooms to the nearest foot, yard, or meter. The lesson includes additional extension suggestions, which are noted at the end of this section. You are also directed to related **Practice Pages** and **Skill Application Game Cards**.

— About the Practice Pages

More than 100 pages of additional practice for all the units have been provided on the CD-ROM at the back of this book. The pages are organized by units and can be printed and copied as needed.

For students who need more practice, based on overall performance, you may need to review elements of the lesson and then assign this additional reinforcement work. Practice pages can also be given as homework or classwork assignments to reinforce or review math skills covered during the year.

Prepare the Practice Pages by downloading the pages from the CD-ROM. Assign practice pages for homework or as a review assignment at a later date, to revisit skills when needed. You may wish to set up any related Skill Application Game cards at a center for students to use throughout the unit. You may choose to introduce a game with a specific lesson or to make the unit games available at other times. In either case, you will need to prepare the reproducible pages ahead of time.

— About the Skill Application Games

Each kit comes with a set of 14 game cards. The “activity” on each card is a math game. The games enhance communication among students, and motivate them to think about and apply the skills and concepts they learn in the lessons. The purpose of the cards is to provide an interactive experience for students in a more real-life math setting. Many of the cards have a content connection that ties the activity to the real world in some way. Two, 11" x 17" cards are included for each of the units. Unit and game card titles are located on the cards. One side of the card contains a full-color game board for use as a playing board. Playing directions and reproducible materials information are provided on the other side of the card. The games are to be played by two or more students.

Note: It is recommended that you review the games and rules with students. See the Skill Application Games section of this book (pages 131–144) for game preparation and directions.

Management

→ About the Skill Application Games (cont.)

In general, the games provided for a given unit can be used as your students work on the lessons and activities for that unit. However, for a more specific connection between the objectives of a game card and a set of lessons within a unit, refer to the Extension section of the lessons. If the objective(s) and activities on the Skill Application Game card reinforce a particular lesson, the card title will be noted among the suggested extensions.

Preparing the Cards

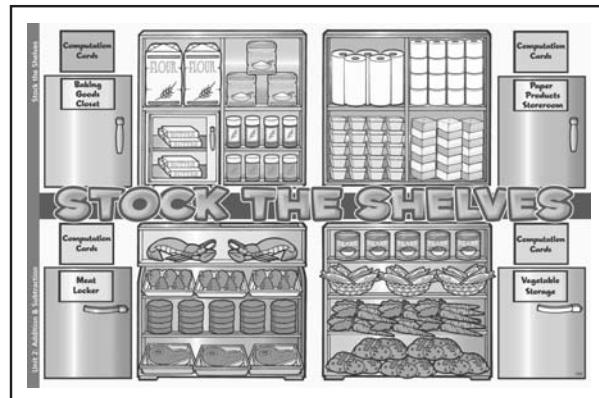
Read the information provided in the Skill Application Games section of this book. Reproduce the materials and prepare the game as directed. You may wish to copy and store the materials in resealable plastic bags or in envelopes and place them inside the folded game cards. Cards can be stored in boxes in a math center. Copy the student directions, and place a copy inside the game card as well. If you choose this method, students will have a copy of the directions in front of them as they play the game.

For students who need additional support with math calculations, keep calculators, number lines, addition/multiplication charts, base-10 blocks, and other manipulatives on hand as they play the games. For additional materials, see the reproducibles sections of each of the units.

Using the Skill Application Games

Since the games are organized by unit, you can choose the appropriate cards to have ready at a center. You could include game boards from other units, provided students are able to perform the math calculations required to complete the activities. Make a schedule indicating when students can use the center and the cards. Be sure to discuss with students the classroom rules for using the center and appropriate student behavior while working on the game cards.

The games can be used over and over again to reinforce the skills and concepts students have learned. As you and your students become more familiar with the activities, you may wish to change the rules of play or the objectives of the game by adding more complex math calculations or a different way to win the game.



Reproduce this page for students and place it with the game.

Stock the Shelves

Activity Topic: Adding and subtracting by 10s and 100s; adding two- and three-digit numbers

Number of Players: 2–4

Directions:

- The youngest player decides which stock room item to change (corn, steak, butter, etc.) and places a marker on that item. This player then selects a card from the pile in that stock room and does the card's computation for that item. Below is an example of a computation card for the Corn Inventory Sheet for your reference.
- Next, the remaining players go to their own stock room and repeat the steps. Make sure all players have a turn. After everyone has completed a calculation for that item of inventory, reshuffle the cards and return them to the stock room.
- The second youngest player selects a different stock room to enter and follows the same steps as above. The other players complete the turn by entering the same stock room and choosing cards for the selected inventory item.
- Continue play until every player has entered and adjusted his or her inventory in each of the four rooms.
- Now play begins. One player takes each stock room a second time, selecting a card and applying the computation to a different stock item. This time the second youngest player chooses the order of the rooms.
- Play continues until one player has the greatest total inventory.
- At the end of four rounds, add up all of your stock items.
- The winner is the player with the greatest total inventory.

How to Win!
Be the player at the end of the game with the most inventory.

Inventory Sheet

	+ 10 =	New Total
Vegetables		
131 cans of beans		
210 cans of corn		
270 carrots		
300 tomatoes		
350 heads of lettuce		
357 packages of bacon		
364 steaks		
386 sticks of butter		
393 bags of sugar		
450 sticks of butter		
500 cans of beans		
555 cans of corn		
585 bags of flour		
600 cans of beans		
625 cans of bacon		
645 sticks of butter		
655 bags of flour		
685 cans of corn		
700 cans of beans		
725 bags of flour		
750 cans of corn		
775 cans of beans		
800 bags of flour		
825 cans of corn		
850 cans of beans		
875 bags of flour		
900 cans of corn		
925 cans of beans		
950 bags of flour		
975 cans of corn		
1,000 cans of beans		
Milk		
Baking Goods		
Paper Products		
Total Inventory		

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40772 Skill Application Games—Level D 24/20

Management

= About the *PowerPoint®* Lesson Option

The unit lessons (with the exception of the Problem-Solving Lessons) include a *PowerPoint®* Lesson Option page of miniature slides. These represent individual slide shows for the lessons in the notebook. The slide shows can be found on the CD-ROM at the back of this guide. Before using the *PowerPoint®* presentations for any of the lessons, check the READ ME file on the CD-ROM for simple instructions on their use. The CD-ROM can be used in both Windows® and Macintosh® formats.

PowerPoint® slide shows provide an alternative method of teaching the Warm-Up Activity and the main lesson components. The lessons on the slides meet the same objectives as the written lessons. It is the presentation that differs. Slide shows have an added visual appeal for presenting the lessons. The full-color slides and a bit of animation tend to focus students' attention as well. If you choose to use the slide show instead of the written lesson, remember that only the Warm-Up Activity, the Whole-Group Skills Lesson, and the Differentiated-Group Skills Practice are covered on the slides. These are the main elements of the lesson. You will need to check the unit lessons for resources, additional group work instructions, and follow-up activities.

Using the Lessons for Review

If you use the written lesson and find that some students need additional review, you may wish to use the *PowerPoint®* Lesson Option as a reinforcement tool for those students.

The *PowerPoint®* lessons can be used as quick whole-group reviews of those lessons you feel students should “brush up on” before completing the unit.

PowerPoint® Lesson Option

Lesson 1.3

Today's Lesson Place Value and Ordering Numbers 	Warm-Up Activity We will warm up today by counting forward and backward in thousands. Remember to count in thousands together. Here are the starting numbers: 5,625 9,214 63,425 96,342 	Remember to count in thousands together. Here are the starting numbers: 5,625 9,214 63,425 96,342 	Whole-Class Skills Lesson Today we will be arranging numbers in sequential order by looking at place value. 
438 421 426 Order these numbers. Look first at the hundreds digit. Each number has a 4 in this column. 	438 421 436 Now, look at the tens digit. We can start to order the numbers. 426 421 438 	Finally, use the ones column to order your numbers. 426 421 438 	Top Tip Remember to order three-digit numbers by looking at the hundreds column, then the tens column, then the ones column. 
256 272 252 Order these numbers. 252 256 272 	356 472 372 Order these numbers. 356 372 472 	5,791 5,652 5,638 Order these numbers. 5,638 5,652 5,791 	3,791 3,692 3,638 Order these numbers. 3,638 3,692 3,791 
9,791 9,971 9,719 Order these numbers. 9,719 9,791 9,971 	78,719 74,971 79,971 Order these numbers. 74,971 78,719 79,971 	62,418 62,148 62,841 Order these numbers. 62,148 62,418 62,841 	Group Practice Identify each digit in a three-digit number. Practice writing three-digit numbers. Practice writing four- and five-digit numbers in words. 

#8774 (iy37) Exploring Math—Unit 1 30 © Teacher Created Materials, Inc.

Management

→ Pacing Plans

The *Exploring Math* kit is designed for flexibility, especially when used in summer intervention or after-school programs where sessions are limited.

Below are some suggestions for using the kit for different purposes and/or in different time frames.

Special Programs—Summer School/Limited Session

Daily Eight-Week Program (40 class sessions)

Over a period of two to three sessions, administer and score the Placement Test to determine which units to use throughout the eight-week session. Rank these units according to the overall class score for each (See Placement Test Class Record, pages 71 and 72.).

To plan the number of sessions per unit, divide the remaining sessions (about 37) by the number of units. You may wish to adjust this number so that more sessions are devoted to the unit on which the students scored the lowest.

Option A: Target Lessons for 2–4 Units

Sample Pacing Chart: Daily Eight-Week Program (3 Units)								
Week								
Day	1	2	3	4	5	6	7	8
Mon.	Placement Test	Unit 2 L-2.4	Unit 2 L-2.10	Unit 4 L-4.1	Unit 4 L-4.7	Unit 4 L-4.12	Unit 5 L-5.6	Unit 5 L-5.12
Tues.	Placement Test	Unit 2 L-2.6	Unit 2 L-2.11	Unit 4 L-4.2	Unit 4 L-4.6	Unit 4 L-4.14	Unit 5 L-5.7	Unit 5 L-5.14
Wed.	Unit 2 L-2.1	Unit 2 L-2.5	Unit 2 L-2.9	Unit 4 L-4.3	Unit 4 L-4.8	Unit 4 L-4.13	Unit 5 L-5.9	Unit 5 L-5.15
Thurs.	Unit 2 L-2.2	Unit 2 L-2.7	Unit 2 L-2.12	Unit 4 L-4.4	Unit 4 L-4.10	Unit 4 L-4.15	Unit 5 L-5.2	Unit 5 L-5.16
Fri.	Unit 2 L-2.3	Unit 2 L-2.8	Unit 2 L-2.13	Unit 4 L-4.5	Unit 4 L-4.11	Unit 5 L-5.1	Unit 5 L-5.10	Unit 5 L-5.17

This sample pacing chart was developed after the Placement Test results indicated that units 2, 4, and 5 should be covered in the eight-week session. Since skills and concepts from Unit 2 need the most attention, more sessions were scheduled to teach lessons from this unit.

Management

— Pacing Plans (cont.)

Daily Eight-Week Program (40 class sessions)

Option B: Teach One Unit

Administer the Placement Test as suggested in Option A. If only one unit is to be completed during this time, you will have an opportunity to cover some lessons over a two-day period. This gives you time to provide additional practice on difficult skills and to investigate the Extension activities more thoroughly. You should also plan more problem-solving practice time, using the strategies learned in the unit.

Option C: Choose Lessons from All Units

Administer the Placement Test as suggested in Option A. If the curriculum guidelines from your intervention program (and/or the Placement Test scores) indicate that all topics should be covered, it will be necessary to reduce the number of lessons offered for each unit. In an eight-week session, for example, you could teach four to five lessons per week, allowing five or six sessions for problem-solving practice. Since each unit contains an average of 20 lessons, you will need to decide which lessons to choose from each unit. (The unit pre-tests can serve as an indicator.)

Daily Six-Week and Four-Week Programs

In a six-week session, with 30 class periods, it is recommended that you select no more than three units on which to focus. This allows you to complete about eight lessons per unit, with remaining sessions devoted to the initial testing and the problem-solving lessons.

Four-week programs provide you with 20 class periods. Since time is limited, your students' needs would be best served if you plan to cover two units at the most.

Whether your program is four weeks or six weeks long, the pacing plan can be similar to the sample daily eight-week program, with adjustments made to cover three-fourths or one-half of the material scheduled for eight weeks.

Ongoing Regular and After-School Programs

Exploring Math was designed as an intervention and reinforcement program. The lessons in the kit cover essential topics that are taught throughout the regular school year. The lessons can support your existing core mathematics program (based on a 40-week time frame, with a minimum of 2.5 to 4 hours of mathematics instruction per week). As you develop a pacing plan for your existing program, include related lessons from this kit that can be used (during or after school) as reinforcement for specific groups of students with diagnosed needs.

Management

→ Pacing Plans (*cont.*)

Note: Depending on the length of each day's session, it is possible to complete two related lessons in one day. Most lessons take between 50 and 60 minutes to complete. If your summer school, or other limited-session program, has daily sessions of 2 to 2 1/2 hours, it is possible to double up on the lessons. (Adjust pre- and post-testing accordingly.)

Problem-Solving Practice: If possible, provide as much problem-solving practice as possible during the sessions. Since two Problem-Solving Lessons are provided in each unit, students will be exposed to at least two opportunities to use specific strategies and organized methods for solving problems. Once students learn how to apply a strategy, they should not be limited to the lessons in the unit. If possible, allow some time each week to solve a few problems using a particular strategy.

Additional Practice: Where appropriate, assign homework from the Extension activities in the lessons, or from selected practice pages located on the CD-ROM.

Summary

Whether you are planning an intervention program for the summer, or working within a regular or after-school program, use the following “3 D’s” to organize your daily schedule.

- **Diagnose** areas of greatest need by administering and scoring the Placement Test to determine your students' needs.
- **Decide** which units (and the number of lessons) to include within the specific time frame of your program.
- **Develop** a pacing chart to plan the specific lessons and suggested activities prescribed in this kit.

Addition and Subtraction Using Money

Learning Objectives

- ✓ Add and subtract using various amounts of money.
- ✓ Use written methods of addition and subtraction.
- ✓ Recognize that addition is the inverse of subtraction.

Resources

- calculators
- “At the Fair” (pages 107 and 108)
- Pre-Test/Post-Test (page 109)

ENTRANCE

Adult	\$3.75
Child (over 10)	\$2.25
Child (under 10)	\$1.25

SNACKS

Cold Drink	70¢	Roller coaster	\$2.40
Hot Dog	\$1.10	Walzer	\$2.25
Potato Chips	60¢	Big Wheel	\$2.05
Ice Cream	90¢	Ghost Train	\$2.30
Chocolate	45¢	Carousel	\$2.10
Cookie	65¢	Hoo-koo-Duck	\$2.15

RIDES

Ferris Wheel	\$4.50	Boat	\$1.50
Roller coaster	\$2.40	Swing	\$1.25
Walzer	\$2.25	Big Wheel	\$2.05
Big Wheel	\$2.05	Ghost Train	\$2.30
Ghost Train	\$2.30	Carousel	\$2.10
Carousel	\$2.10	Hoo-koo-Duck	\$2.15

At the Fair (cont.)

1. Calculate the total cost for each group to go to the fair.

Group A	2 adults 3 children (over 10) 1 child (under 10)	Total _____
Group B	2 adults 2 children (over 10) 1 child (under 10)	Total _____
Group C	12 adults 8 children (over 10)	Total _____

2. At the County Fair, Cheryl spent \$2.00 on popcorn and \$1.25 for a game. How much did she spend? What was her total cost?

A. \$4.24
B. \$4.34
C. \$3.94
D. \$4.26

3. Christina rode the Whirly Bird Twister. Her ticket cost \$1.25. She also rode the Scarecrow's Castle, which cost \$2.05. How much did she spend?

F. \$6.20
G. \$6.40
H. \$6.17
I. \$6.18
J. \$6.28
K. \$5.18
L. \$5.26

4. At the County Fair, C.J. spent \$3.89 for a hamburger and \$2.29 for a soft drink. How much did he spend? What was his total cost?

A. \$6.17
B. \$6.18
C. \$6.28
D. \$5.18
E. \$5.26

5. Alex bought a goldfish on sale for \$1.25. The original price was \$4.25. How much did he save from the original price?

F. \$1.26
G. \$2.26



Mental Math and Number Sense Skills

Warm-Up Activity

1. Ask the class to quickly mentally recall number facts to 20.
2. Ask each student in turn to provide pairs of numbers in multiples of 50 that total 1,000.

Examples

$$250 + 750 \quad 600 + 400 \quad 300 + 700 \quad 650 + 350$$

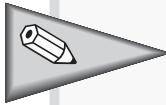
3. Conclude by asking students for a set of three numbers that are multiples of 50 which total 1,000.

Examples

$$200 + 300 + 500 \quad 700 + 200 + 100 \quad 350 + 250 + 400$$



Whole-Class Skills Lesson



If the Pre-Test (page 109) has not yet been given, administer it at this time. (See pages 8–11 for information.)

Prepare to group students for the Differentiated-Group Skills Practice, which follows the Whole-Class Skills Lesson.

Use the directions below, or the *PowerPoint®* presentation (see *PowerPoint®* Lesson Option preview, page 106), to teach this lesson.

1. Tell the students, “Today we are going to practice adding and subtracting different sums of money.”
2. Review the different addition and subtraction methods used in previous lessons.
3. Highlight the use of a decimal point to demonstrate when different amounts of money are involved in addition and subtraction problems.
4. Provide numerous examples on the board and invite students to use their choice of method to find the answers.

Examples

$$\$76.43 + \$23.01 = \underline{\hspace{2cm}}$$

$$\$42 + \$64.47 + \$3 + \$19 = \underline{\hspace{2cm}}$$

$$\$4,219 - \$3,336 = \underline{\hspace{2cm}}$$

$$\$6.73 + \$6.75 + \$3.20 = \underline{\hspace{2cm}}$$

5. Make sure that each student in the class has the opportunity to fill in an answer on the board, showing his or her chosen method.



Differentiated-Group Skills Practice

Below Level – Teacher Directed

- Working with the group, look at adding amounts of money in a list where the values are different and the number of digits varies.
- Ask students to add sums such as: $\$0.20 + \$1.50 + \$0.79 + \12.84 .
- After each student has practiced addition, review money subtraction problems by asking students to find the change from different amounts of money. For example, if they had \$20 but spent \$4.25 on lunch, how much money would they have left?
- The students should then practice solving problems, finding the totals of sums of money and differences by creating several problems and exchanging them with another student.

Above Level/On Level – Student Directed

- The students should work in pairs and refer to the pricing charts on the first page of “At the Fair” (page 107) to complete the questions on the second page of “At the Fair” (page 108). Provide each pair with a calculator.
- The students should use their chosen written methods to work out each answer and then fill in their answers on the activity sheet.

Lesson Review

Discuss the written procedures used for addition and subtraction of money.

Provide examples for the students to practice mental methods for adding and subtracting.



Administer the Post-Test (page 109) at this time.
(See pages 8–11 for information.)

Extension

Your paid \$4.92 for lunch. What would your change be if you paid with a five-dollar bill? A ten-dollar bill? A twenty-dollar bill?

Additional Extension Resources:

- CD-ROM Practice Pages: 38–40

PowerPoint® Lesson Option

Lesson
2.11

<p>Today's Lesson</p> <p>Addition and Subtraction Using Money</p> <p>MATH</p>	<p>Warm-Up Activity</p> <p>We will warm up today by adding numbers to make 20 and multiples of 50 to make 1,000.</p> <p>MATH</p>	<p>4</p> <p>You will see a number card.</p> <p>MATH</p>	<p>4</p> <p>What do you need to add to this number to total 20?</p> <p>MATH</p>				
<p>4</p> <p>16</p> <p>MATH</p>	<p>12</p> <p>What do you need to add to this number to total 20?</p> <p>MATH</p>	<p>6</p> <p>What do you need to add to this number to total 20?</p> <p>MATH</p>	<p>8</p> <p>What do you need to add to this number to total 20?</p> <p>MATH</p>				
<p>11</p> <p>What do you need to add to this number to total 20?</p> <p>MATH</p>	<p>14</p> <p>What do you need to add to this number to total 20?</p> <p>MATH</p>	<p>2</p> <p>What do you need to add to this number to total 20?</p> <p>MATH</p>	<p>9</p> <p>What do you need to add to this number to total 20?</p> <p>MATH</p>				
<p>20</p> <p>What do you need to add to this number to total 20?</p> <p>MATH</p>	<p>13</p> <p>What do you need to add to this number to total 20?</p> <p>MATH</p>	<p>11</p> <p>What do you need to add to this number to total 20?</p> <p>MATH</p>	<p>Name a pair of numbers in multiples of 50 that total 1,000.</p>  <p>Continue around the class until you have all provided a pair of numbers.</p> <p>MATH</p>				
<p>Now try a trio of numbers in multiples of 50 that total 1,000.</p>  <p>MATH</p>	<p>Whole-Class Skills Lesson</p> <p>Today we are going to practice adding and subtracting different sums of money.</p> <p>MATH</p>	<p>What do you know about addition?</p> <ul style="list-style-type: none"> Partitioning Method Short-Column Method <p>Do you remember the steps involved for the different strategies that we have used in the past?</p> <p>Which method did you prefer? Why?</p> <p>MATH</p>	<p>What do you know about subtraction?</p> <ul style="list-style-type: none"> Partitioning Method Short-Column Method Adjusting Method <p>Do you remember the steps involved for the different strategies that we have used in the past?</p> <p>Which method did you prefer? Why?</p> <p>MATH</p>				
<p>Choose a method to solve this problem.</p> $7,643 + 2,301 = \boxed{}$ <p>MATH</p>	<p>Choose a method to solve this problem.</p> $42 + 6,447 + 3 + 19 = \boxed{}$ <p>MATH</p>	<p>Choose a method to solve this problem.</p> $4,219 - 3,336 = \boxed{}$ <p>MATH</p>	<p>Choose a method to solve this problem.</p> $\$6.73 + \$6.75 + \$3.20 = \boxed{}$ <p>Did you remember to use the decimal point correctly?</p> <p>MATH</p>				
<p>Group Work</p> <table border="1"> <tr> <td></td> <td>Practice adding amounts of money from a list of varying amounts. Find the change from different amounts.</td> </tr> <tr> <td></td> <td>Solve problems finding the total sums and differences of money.</td> </tr> </table> <p>MATH</p>		Practice adding amounts of money from a list of varying amounts. Find the change from different amounts.		Solve problems finding the total sums and differences of money.			
	Practice adding amounts of money from a list of varying amounts. Find the change from different amounts.						
	Solve problems finding the total sums and differences of money.						

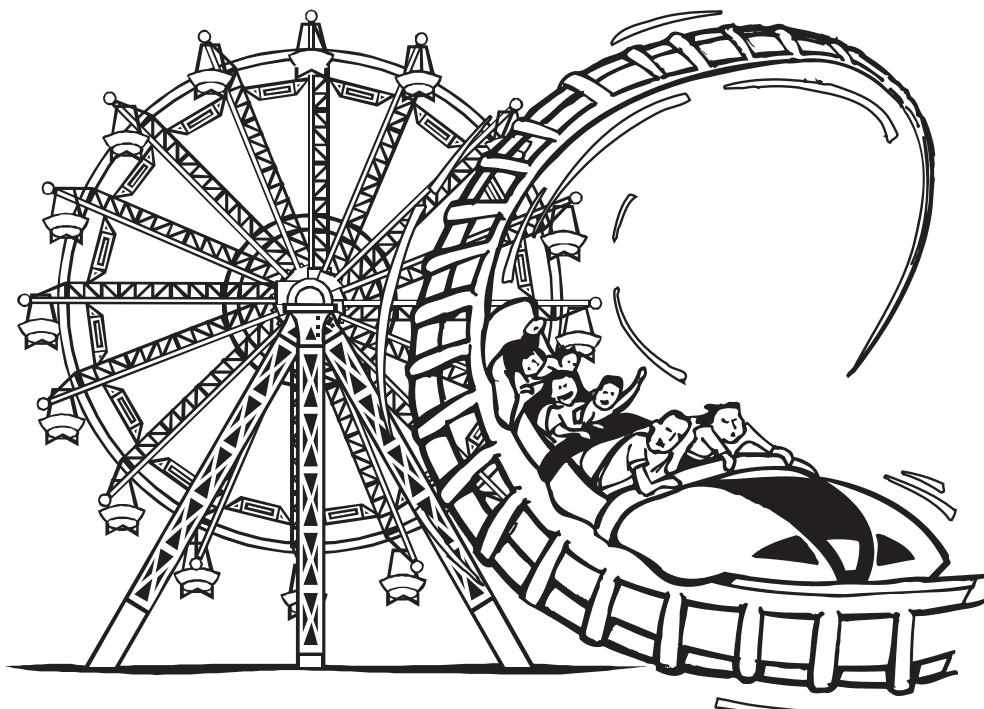
At the Fair

2.11

ENTRANCE

Adult	\$3.75
Child (over 10)	\$2.25
Child (under 10)	\$1.25

SNACKS		RIDES	
Cold Drink	70¢	Roller Coaster	\$2.40
Hot Dog	\$1.10	Waltzer	\$2.25
Potato Chips	60¢	Big Wheel	\$2.05
Ice Cream	90¢	Ghost Train	\$2.30
Chocolate	45¢	Carousel	\$2.10
Cookie	65¢	Hook-a-Duck	\$2.15



At the Fair (cont.)

2.11

Name _____ Date _____

- Calculate the total cost for each group to go to the fair.

Group A

4 adults
3 children (over 10)
2 children (under 10)

Total _____

Group B

2 adults
6 children (over 10)
1 child (under 10)

Total _____

Group C

12 adults
2 children (over 10)

Total _____

- Janine, Malik, and Louise go to the fair. After paying their admission fee (\$2.25 each), they each have \$10 to spend. They go on two rides each. Janine has \$5.85 left, Malik has \$5.65, and Louise has \$5.30. Which rides did each student go on?
- How much of his \$5 will Jamie have after he has a ride on the Waltzer and buys a drink and ice cream?
- Jane has \$2.50. Can she afford to have a ride on the Carousel and buy a hot dog?
- How much would it cost Mariah to buy three drinks, three ice creams, four cookies, and two hot dogs? How much change would she have from \$20?
- Desmond has \$10. He goes on three different rides and buys one bar of chocolate. He has \$2.85 left. Which three rides did he go on?
- How much would it cost for a family of four (two adults and two children over the age of 10) to go on each ride once in addition to the entrance fee?
- Plan a visit to the fair for two adults, a child over 10, and two children under 10. They each want to go on three rides and have something to eat and drink. How much would it cost? Show your plan for their visit.

Pre-Test**Post-Test**

- 1** At the County Fair, Cheryl spent \$2.35 on popcorn and \$1.89 for a lemonade. What was her total cost?

A \$4.24
B \$4.34
C \$3.94
D \$4.26

- 2** Christina rode the Whirly Bird Twister, which costs \$3.75 and the Screamin' Coaster, which costs \$2.65. How much did she spend?

F \$6.20
G \$6.40
H \$6.85
J \$5.40

- 3** Andy bought a green anole lizard for \$7.95 and a small iguana for \$19.49. How much did he spend in all?

A \$28.54
B \$27.54
C \$26.44
D \$27.44

- 1** At the County Fair, C. J. spent \$3.89 for a hamburger and \$2.29 for a soft drink. What was the total cost?

A \$6.17
B \$6.18
C \$6.28
D \$5.18

- 2** Alex bought a goldfish on sale for \$2.99. The original price was \$4.25. How much did he save from the original price?

F \$1.26
G \$2.26
H \$1.24
J \$2.06

- 3** Patrick rode the Ferris Wheel for \$3.75 and the Loopyloop for \$2.95. How much less was the Loopyloop ride?

A \$1.80
B \$0.90
C \$0.70
D \$0.80

Name

3

Name

3

Problem-Solving Lesson

Using Strategies to Solve Real-Life Problems

Resources

- ✓ Problem-Solving Strategy Card and transparencies: “Using Logical Reasoning”
- ✓ Real-Life Problem-Solving Card and transparencies: “Football Playoffs”
- ✓ Optional: copies of strategy and problem-solving cards (see Teacher Resource Guide CD-ROM). If an overhead projector is unavailable, use the problem-solving card provided (or download from the CD-ROM) to prepare copies of the cards for students to use during the lesson.

Introducing the Strategy

Problem-Solving Strategy Card: Using Logical Reasoning

Introduce the Strategy

Introduce or review the strategy using the following steps.

1. On the overhead, place Side A of the Problem-Solving Strategy Card transparency titled “Using Logical Reasoning.” Discuss the information in the box, reinforcing how logical reasoning can be a useful tool for solving problems.
2. Work through the problem on the bottom of the page. Ask students to explain how logical reasoning helped put the pieces of information together to solve the problem. Point out how a chart helps determine the answer.
3. Place the transparency for Side B of the strategy card on the overhead projector. Read and discuss the Sample Problem.
4. Read and discuss each of the four steps shown (Understanding the Problem, Planning and Communicating a Solution, Reflecting and Generalizing, and Extension) as it applies to the Sample Problem. Reinforce with students the importance of reflecting on how the solution was reached. Have them think of other problems that could be created as an extension of the original one.

Review the Strategy

1. Reread the strategy card with the students and review key information. Remind students that when using this strategy, they are using the process of elimination to solve the problem.
2. Review with students how to use logical reasoning. Emphasize that it is important to work sequentially. It is important for students to pick a starting point and work methodically.
3. In order to use the strategy of using logical reasoning to solve a problem, students will need to understand the question being asked. Reinforce that they must determine what information they will need to solve the problem.
4. Read the problem to determine the information already known. Suggest that underlining and highlighting the information from the problem may be useful. Then, put the information in a table in order to use the process of elimination.

Problem-Solving Lesson

Using Strategies to Solve Real-Life Problems

Applying the Strategy

Real-Life Problem-Solving Card: “Football Playoffs”

UNDERSTANDING THE PROBLEM

Getting Ready

- Place the transparency for Side A of “Football Playoffs” on an overhead projector.
- Together, read and discuss the information on Side A of the card. Ask students if they have ever watched a football game. Be sure to discuss the meanings of unfamiliar words. Discuss any other information that students may need clarified before solving the problems.
- Explain to students that they will be assigned to a group and given a specific problem to solve based on the information on Side A of the card. They will use the strategy of using logical reasoning to solve the problem.
- Divide the class into groups based on ability levels indicated on Side B of the card (Problem A: Below Level, Problem B: On Level, Problem C: Above Level).

What do I know?

- Help students identify information that will be needed to solve the problem. Students may have to reread “Football Playoffs” in order to locate some of the needed information.

Problem A: On the front of the card, the students read about the scenario for the NFC. Once the winners and losers are determined, the process of elimination can be used to find the two teams that will make the playoffs.

Problem B: On the front of the card, the students read about the scenario for the NFC. Once the winners and losers are determined, the process of elimination can be used to find the two teams that will make the playoffs.

Problem C: On the front of the card, the students read about the scenario for the NFC. Once the winners and losers are determined, the process of elimination can be used to find the two teams that will make the playoffs.

What do I need to find out?

- Identify what question needs to be answered when solving the problem.
- Have students write the question(s) that need(s) to be answered at the top of their work papers.

Problem A: Calculate the scores for the four games. From the outcomes, determine which two NFC teams will make the playoffs.

Problem B: Calculate the scores for the four games. From the outcomes, determine which two NFC teams will make the playoffs.

Problem C: Calculate the scores for the four games. From the outcomes, determine which two NFC teams will make the playoffs.

PLANNING AND COMMUNICATING A SOLUTION

Solving the Problem

Use the following information to guide students’ thinking as they plan and solve the specific problem to which they are assigned.

For all three of these problems, students will use the process of elimination to determine the two NFC teams that will make the playoffs. Have students determine the winner and loser from each team.

Once the students have the winners and losers from each game, the students must look at the scenario on the front of the card to determine who will make the playoffs.

Problem-Solving Lesson

Using Strategies to Solve Real-Life Problems

Applying the Strategy (cont.)

Real-Life Problem-Solving Card: “Football Playoffs” (cont.)

Problem A

Students should determine the winner and loser from each game. Addition will be used. The values for a touchdown and field goal are on the front of the card. Once the students have the winners and losers, they must use the scenario for the NFC to determine the two teams that will make it to the playoffs. The Vikings needed to win and have the Rams lose. The Vikings did not win nor did the Rams lose; therefore, they did not make the playoffs. The Panthers needed to win and have the Vikings lose. Even though the Vikings lost, the Panthers did not win; therefore, the Panthers did not make the playoffs. The Saints needed a win and to have the Seahawks win. The Saints and Seahawks both won their games; therefore, the Saints made it to the playoffs. The Rams needed to win and have the Vikings lose. The Rams won and the Vikings lost; therefore, the Rams made it to the playoffs.

Problem B

Students should determine the winner and loser from each game. Multiplication and addition will be used. The values for a touchdown and field goal are on the front of the card. Once the students have the winners and losers, they must use the scenario for the NFC to determine the two teams that will make it to the playoffs. The Vikings needed to win and have the Rams lose. The Vikings did not win nor did the Rams lose; therefore, they did not make the playoffs. The Panthers needed to win and have the Vikings lose. Even though the Vikings lost, the Panthers did not win; therefore, the Panthers did not make the playoffs. The Saints needed a win and have the Seahawks win. The Saints and Seahawks both won their game; therefore, the Saints made it to the playoffs. The Rams needed to win and have the Vikings lose. The Rams won and the Vikings lost; therefore, the Rams made it to the playoffs.

Problem C

Students should determine the winner and loser from each game. Multiplication and addition will be used. The values for a touchdown and field goal are on the front of the card. Once the students have the winners and losers, they must use the scenario for the NFC to determine the two teams that will make it to the playoffs. The Vikings needed to win and have the Rams lose. The Vikings did not win nor did the Rams lose; therefore, they did not make the playoffs. The Panthers needed to win and have the Vikings lose. Even though the Vikings lost, the Panthers did not win; therefore, the Panthers did not make the playoffs. The Saints needed a win and to have the Seahawks win. The Saints and Seahawks both won their games; therefore, the Saints made it to the playoffs. The Rams needed to win and to have the Vikings lose. The Rams won and the Vikings lost; therefore, the Rams made it to the playoffs.

Solutions

Problem A

The results for the 4 games are as follows:

Game 1 – Vikings 20 and Redskins 24 (Subtract 24 from 44.)

Game 2 – Saints 21 and Panthers 20 (Subtract 20 from 41.)

Game 3 – Rams 38 and Jets 35 (Subtract 38 from 73.)

Game 4 – Seahawks 21 and Falcons 17 (Subtract 17 from 38.)

The Rams and Saints made the playoffs.

Problem-Solving Lesson

Using Strategies to Solve Real-Life Problems

Applying the Strategy (cont.)

Real-Life Problem-Solving Card: “Football Playoffs” (cont.)

Problem B

The results for the 4 games are as follows:

Game 1 – Seahawks 21 ($3 \times 7 = 21$) and Falcons 17 [$(2 \times 7) + 3 = 17$]

Game 2 – Vikings 20 [$(2 \times 7) + (2 \times 3) = 20$] and Redskins 24 [$(3 \times 7) + 3 = 24$]

Game 3 – Rams 38 [$(5 \times 7) + 3 = 38$] and Jets 35 (5×7)

Game 4 – Saints 21 ($3 \times 7 = 21$) and Panthers 20 [$(2 \times 7) + (2 \times 3) = 20$]

The Rams and Saints made the playoffs.

Problem C

The results for the 4 games are as follows:

Game 1 – Vikings 20 and Redskins 24 [$(3 \times 7) + 3 = 24$, then subtract 24 from 44 to get the score for the Vikings]

Game 2 – Rams 38 and Jets 35 [$(5 \times 7) = 35$, then subtract 35 from 73 to get the score for the Rams]

Game 3 – Falcons 17 and Seahawks 21 [$(3 \times 7) = 21$, then subtract 21 from 38 to get the score for the Falcons]

Game 4 – Panthers 20 and Saints 21 [$(3 \times 7) = 21$, then subtract 21 from 41 to get the score for the Panthers]

The Rams and Saints made the playoffs.

REFLECTING AND GENERALIZING

Problem A

Have students review the information on Side A of the Real-Life Problem-Solving Card. Have students review the scores and the scenario for each team. Have students check that 7 was used for a touchdown and 3 was used for a field goal.

Problem B

Have students review the information on Side A of the Real-Life Problem-Solving Card. Have students review the scores and the scenario for each team. Have students check that 7 was used for a touchdown and 3 was used for a field goal.

Problem C

Have students review the information on side A of the Real-Life Problem-Solving Card. Have students review the scores and the scenario for each team. Have students check that 7 was used for a touchdown and 3 was used for a field goal.

EXTENSIONS

Use the Class Challenge to solve an additional problem related to the topic.

The results for the 4 games are as follows:

Game 1 – Steelers 29 and Bills 24 [$(3 \times 7) + 3 = 24$, then subtract 24 from 53 to get the score for the Steelers]

Game 2 – Dolphins 23 and Ravens 30 [$(3 \times 7) + (3 \times 3) = 30$, then subtract from 53 to get the score for the Dolphins]

Game 3 – Jaguars 13 and Raiders 6 [$(2 \times 3) = 6$, then subtract 6 from 19 to get the score for the Dolphins]

Game 4 – Colts 14 and Broncos 33 [$(3 \times 7) + (4 \times 3) = 33$, then subtract 33 from 47 to get the score for the Colts]

The Broncos and Jets made the playoffs.

Research the last five years to find the six NFC teams and six AFC teams that made the playoffs each year. Which team(s) made it to the playoffs more than once?

Football Playoffs



TCM STAFF

At the start of every football season, professional football teams want to accomplish one goal. The goal is to win the Super Bowl. To win the Super Bowl, the team must first make the playoffs. There are times when it comes down to the last week of the regular season to find out which teams will make it to the playoffs. This season both the NFC and AFC have two more playoff spots to fill. Which teams will make it?

NATIONAL FOOTBALL CONFERENCE (NFC)

Team

Minnesota Vikings
Carolina Panthers
New Orleans Saints
St. Louis Rams

Scenario

in with win and Rams loss
in with win and Vikings loss
in with win and Seahawks win
in with win and Vikings loss

Football Key

Touchdown = 7 points
Field Goal = 3 points

AMERICAN FOOTBALL CONFERENCE (AFC)

Team

New York Jets
Denver Broncos
Buffalo Bills
Jacksonville Jaguars
Baltimore Ravens

Scenario

in with win and Bills loss or Broncos loss
in with win
in with win and Jets loss or Broncos loss
in with win and losses by Broncos and Bills
in with win and losses by Broncos, Bills, and Jaguars

WHAT IS THE PROBLEM?

You are the sportswriter for your school's newspaper. It is your job to report which two teams from the NFC made the playoffs. Use the outcomes from the games played on Sunday to determine the winners and losers. Then determine which two teams will make it to the playoffs.

Use the information on both sides of the card and in the problems below to answer the questions. You will be asked to work on one of the problems below. Before you begin solving the problem, be sure to locate the information you will need.

PROBLEM-SOLVING STRATEGY: USING LOGICAL REASONING **Problem A**

Calculate the scores for the four games listed below. From the outcomes, determine which two NFC teams will make the playoffs.

Game 1—Vikings and Redskins scored a total of 44 points. Redskins scored 24 points.

Game 2—The Saints and Panthers scored a total of 41 points. The Panthers scored 20 points.

Game 3—The Rams and Jets scored a total of 73 points. The Rams scored 38 points.

Game 4—The Seahawks and Falcons scored a total of 38 points. The Falcons scored 17 points.

 **Problem B**

Calculate the scores for the four games listed below. From the outcomes, determine which two NFC teams will make the playoffs.

Game 1—The Seahawks scored 3 touchdowns. The Falcons scored 2 touchdowns and a field goal.

Game 2—The Redskins scored 3 touchdowns and one field goal. The Vikings scored 2 touchdowns and 2 field goals.

Game 3—The Rams scored 5 touchdowns and one field goal. The Jets scored 5 touchdowns.

Game 4—The Saints scored 3 touchdowns. The Panthers scored 2 touchdowns and 2 field goals.

 **Problem C**

Calculate the scores for the four games listed below. From the outcomes, determine which two NFC teams will make the playoffs.

Game 1—The Redskins scored 3 touchdowns and 1 field goal. The Redskins and Vikings scored a total of 44 points.

Game 2—The Jets scored 5 touchdowns. The Jets and Rams scored a total of 73 points.

Game 3—The Seahawks scored 3 touchdowns, and the Falcons and Seahawks scored a total of 38 points.

Game 4—The Saints scored 3 touchdowns. The Saints and Panthers scored a total of 41 points.

Class Challenge

You need to determine the two teams that will make it to the playoffs from the AFC.

Game 1—Steelers and Bills scored a total of 53 points. The Bills scored 3 touchdowns and 1 field goal.

Game 2—Dolphins and Ravens scored a total of 53 points. The Ravens scored 3 touchdowns and 3 field goals.

Game 3—Jaguars and Raiders scored a total of 19 points. The Raiders scored 2 field goals.

Game 4—Colts and Broncos scored a total of 47 points. The Broncos scored 3 touchdowns and 4 field goals.

Using Logical Reasoning

Logical reasoning is different from the other strategies, where sometimes guesses are made and then checked. When logical reasoning is used, you begin with the knowledge that each piece of information is a piece of the puzzle, and that by putting the pieces together, you will find a solution.

You will work step by step to solve logical reasoning problems. Using the process of elimination is very common in solving logical reasoning problems.

Use the following information to learn more about solving problems using logical reasoning.

Read Each Clue Thoroughly

 **Reading each clue thoroughly is one of the vital skills in solving problems using logical reasoning. It is very important that you take the time to read the clues and understand each one before reading the next. Once you understand each clue, you can decide where to begin solving the problem.**

Decide Where to Begin

 **Often the clues need to be considered in a different order than they are presented.**

Check It Out!

Julie, Yushiko, and Sam are each about to eat a sandwich for lunch. On the plate there are a ham sandwich, a peanut butter sandwich, and a grape jelly sandwich. Use the following clues to find out which sandwich belongs to which person.

Julie's sandwich is on a deli roll.

Sam is allergic to peanuts.

Yushiko doesn't like sweet things on her sandwiches.

It is probably easiest to begin with the fact that Sam is allergic to peanuts, which means the peanut butter sandwich cannot be his. Julie's sandwich is on a deli roll, so it is not likely to be the peanut butter sandwich or the grape jelly sandwich. She must have the ham sandwich. This leaves Sam with the grape jelly sandwich (which Yushiko would not have had since she hates sweet sandwiches). So Yushiko has the peanut butter sandwich.

Draw Up a Grid Listing the Names and Choice

 **Drawing up a grid can be a convenient way of visualizing the information in the problem.**

For the previous example the grid would look like this:

	Ham	Peanut Butter	Grape Jelly
Julie		X	X
Yushiko	X		X
Sam	X	X	

You can mark off each option on the grid to solve the problem.

Using the Strategy

Sample Problem

George, Paul, Barbara, and Frances own four dogs called Bubba, Penny, Ginger, and Foxy. Use the clues to find out which dog belongs to which owner:

- Nobody owns a dog whose name starts with the same letter as their own.
- Barbara and Penny's owner are friends.
- Paul's sister owns Foxy.
- Frances gives Ginger's owner a bone.
- Ginger's owner said Barbara's dog was aggressive.
- George wished he had a dog like Bubba.



UNDERSTANDING THE PROBLEM

What do we know?

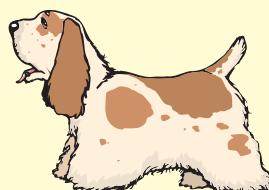
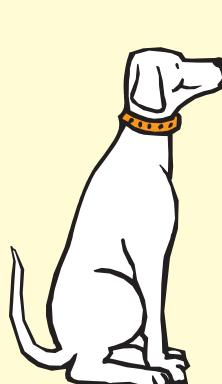
There are four children, and each owns a dog.

Each dog's name starts with a different letter than its owner's name.

What do we need to find out?

Which dog belongs to which person?

What clue will be a good starting point?



PLANNING AND COMMUNICATING A SOLUTION

Draw a 5×5 grid. Use the symbols X (no) and ✓ (yes) to record the information you know from the clues. Your completed grid would look like this:

	Bubba	Penny	Ginger	Foxy
George	X	✓	X	X
Paul	X	X	✓	X
Barbara	X	X	X	✓
Frances	✓	X	X	X



REFLECTING AND GENERALIZING

Think about the strategy of creating a grid and using check marks to represent the information in the grid. Is this a logical approach to use when several statements are made? Is there another way to solve the problem?



EXTENSION

Write your own logic problem like this one using five people and five objects. Make sure you have included enough clues to allow the problem to be solved.