

Sample Pages from
*Exploring Math: An Intervention &
Reinforcement Resource Level A*

- Teacher Resource Guide Introduction
- Unit 1 Sample Lessons:
 - 1.11 Comparing and Ordering Numbers
 - Real-Life Problem-Solving Lesson
- Problem-Solving Strategy Card: Drawing a Table
- Real-Life Problem-Solving Card: On the Farm

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
- 4 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 student activity pages, tests, problem-solving and strategy cards, reproducible pages, 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 *Exploring Math* kit contains specific, sequential lessons by topic, and are divided into units that target the following content goals and processes:

Numbers and Numeration
Operations and Computation
Patterns and Algebraic Thinking
Geometry
Measurement
Data Analysis
Problem-Solving
Mathematical Reasoning and Proof

Introduction

Units

Each unit is organized as follows:

Table of Contents

Introduction

Unit Lessons

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

Answer Key

- Student Activity Pages
- 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 reproducible pages 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 presentation. 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. Thumbnail copies of the *PowerPoint*[®] slides are 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 are used as manipulatives. Other pages provide reference information for the students.

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

The World's Longest Rivers

River	Length in miles	Rounded to the nearest 10 miles	Rounded to the nearest 100 miles	Rounded to the nearest 1,000 miles
Nile	4,144			
Amazon	4,011			
Yangtze-Kiang	3,963			
Mississippi-Missouri	3,741			
Yenisey-Angara	3,442			
Huang He	3,384			
Ob-Irtys	3,361			
Zaire-Congo	2,903			
Mekong	2,792			
Amur	2,721			

Reproducibles

Number Cards 0-9

0	1	2	3
4	5	6	7
8	9	0	1
2	3	4	5
6	7	8	9

Answer Key

Page 95

Page 101

Page 114

Page 121

Page 127

Introduction

Units: Lesson Organization

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

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

A visual representation of the pre- and post-test, student activity pages, and reproducible pages is provided.

Focused learning objectives are identified.

A standards correlations chart, located in the *Teacher Resource Guide*, matches lesson objectives to national standards.

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.

Lesson 1.3 **Place Value and Ordering Numbers** **Unit 1**

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)

Number Cards 0–9

0	1	2	3
4	5	6	7
8	9	0	1

Raffle Tickets

Name	Number	Prize

Mental Math and Number Sense Skills

Warm-Up Activity

1. With the class, practice counting forward and backward by thousands from three-, four-, and five-digit numbers.
2. Provide an example number, such as 9,310, and ask students to count forward together, by thousands, to 19,310.
3. Provide an example number, such as 56,224, and ask students to count backward together, by thousands, to 42,224.
4. Continue assigning starting numbers and ask students to count forward or backward in thousands. In each case, give the class an appropriate ending number.

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Lessons identify specific resources, including classroom manipulatives and/or reproducible pages, 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, the *PowerPoint*® Lesson Option can replace this written warm-up lesson.

Introduction

Units: Lesson Organization (cont.)

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.

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: $7\textcircled{2}1$ $7\textcircled{4}2$ $7\textcircled{1}5$
ascending order: 715; 721; 742
 $4, \textcircled{6}52$ $4, \textcircled{7}91$ $4, \textcircled{6}38$
ascending order: 4,638; 4,652; 4,791
5. Continue practicing this method with additional examples like the ones above.

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

PowerPoint® Lesson Option information is listed here.

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

Introduction

Units: Lesson Organization (cont.)

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

Lesson 1.3 **Place Value and Ordering Numbers** **Unit 1**

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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:
 $1,264,521 = 1,000,000 + 200,000 + \underline{\quad} + 4,000 + 500 + 20 + 1$
 - 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

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

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

Suggestions for the Lesson Review are included. They provide an opportunity for group discussion and reflection.

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.

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.

Introduction

Units: Lesson Organization (cont.)

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*[®] presentations 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

<p style="text-align: center;">Today's Lesson</p> <p style="text-align: center;">Place Value and Ordering Numbers</p>	<p style="text-align: center;">Warm-Up Activity</p> <p style="text-align: center;">We will warm up today by counting forward and backward in thousands.</p>	<p style="text-align: center;">Remember to count in thousands together.</p> <p style="text-align: center;">Here are the starting numbers.</p> <p style="text-align: center;">5,625 9,214</p> <p style="text-align: center;">63,425 96,342</p>	<p style="text-align: center;">Whole-Class Skills Lesson</p> <p style="text-align: center;">Today we will be arranging numbers in sequential order by looking at place value.</p>
<p style="text-align: center;">438 421 426</p> <p style="text-align: center;">Order these numbers.</p> <p style="text-align: center;">Look first at the hundreds digit.</p> <p style="text-align: center;">Each number has a 4 in this column.</p>	<p style="text-align: center;">438 421 426</p> <p style="text-align: center;">Now, look at the tens digit.</p> <p style="text-align: center;">We can start to order the numbers.</p> <p style="text-align: center;">426 421 438</p>	<p style="text-align: center;">Finally, use the ones column to order your numbers.</p> <p style="text-align: center;">426 421 438</p> <p style="text-align: center;">421 426 438</p>	<p style="text-align: center;">Top Tip</p> <p style="text-align: center;">Remember to order three-digit numbers by looking at the hundreds column, then the tens column, then the ones column.</p>
<p style="text-align: center;">256 272 252</p> <p style="text-align: center;">Order these numbers.</p> <p style="text-align: center;">Smallest Largest</p> <p style="text-align: center;">252 256 272</p>	<p style="text-align: center;">356 472 372</p> <p style="text-align: center;">Order these numbers.</p> <p style="text-align: center;">Smallest Largest</p> <p style="text-align: center;">356 372 472</p>	<p style="text-align: center;">5,791 5,652 5,638</p> <p style="text-align: center;">Order these numbers.</p> <p style="text-align: center;">Smallest Largest</p> <p style="text-align: center;">5,638 5,652 5,791</p>	<p style="text-align: center;">3,791 3,692 3,638</p> <p style="text-align: center;">Order these numbers.</p> <p style="text-align: center;">Smallest Largest</p> <p style="text-align: center;">3,638 3,692 3,791</p>
<p style="text-align: center;">9,791 9,971 9,719</p> <p style="text-align: center;">Order these numbers.</p> <p style="text-align: center;">Smallest Largest</p> <p style="text-align: center;">9,719 9,791 9,971</p>	<p style="text-align: center;">78,719 74,971 79,971</p> <p style="text-align: center;">Order these numbers.</p> <p style="text-align: center;">Smallest Largest</p> <p style="text-align: center;">74,971 78,719 79,971</p>	<p style="text-align: center;">62,418 62,148 62,841</p> <p style="text-align: center;">Order these numbers.</p> <p style="text-align: center;">Smallest Largest</p> <p style="text-align: center;">62,148 62,418 62,841</p>	<p style="text-align: center;">Group Practice</p> <ul style="list-style-type: none"> 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 *PowerPoint*[®] slides present only the Warm-Up Activity and Whole-Class Skills Lesson.

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-up activities and main lesson.

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 *PowerPoint*[®] presentation for the Warm-Up Activity and the Whole-Class Skills Lesson, 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 more 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

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 problem-solving lessons, they begin to see problem solving as a process. In addition, students are provided 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 Level A kit focuses on one of these strategies. Four strategies are used in the Level A kit.

In this 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 Real-Life 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 Resources section of the lesson specifies 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 Real-Life Problem-Solving Lesson.

□ About the Problem-Solving Lesson

Strategy

The Real-Life Problem-Solving Lesson begins with an introduction to the problem-solving strategy that will be used in the lesson. The sample strategy card shown here introduces and models the strategy of “Drawing a Table.”

Unit 1 Problem-Solving Strategy Card

Drawing a Table

When a problem has lots of information, placing the information in a table is a great 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 shown, the information often shows 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 something.

It is not 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 whether the information needs to be in a row or a column. Be sure you understand what the table is going to tell you.
- Headings are also important because they show the most important parts of the table.

A quick look at the table shows that 300 students can be found among 1,000 people.

How do you know? You worked with multiples of 10. When working with multiples, a table can help you find patterns.

Example: Research shows that three out of every 10 people have blonde hair. How many students can be found among 1,000 people?

For this problem, you need to make a table with two columns: **Number of Students**, and **Number of People**.

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

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SIDE A

STRATEGY: DRAWING A TABLE Problem-Solving Strategy Card

Unit 1—Side B

Using the Strategy

Sample Problem

A group of students is learning to sing songs 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, the students know three verses.

At the end of the third week, the students can recite six verses. At the end of the fourth week, they know ten.

How many verses would they be able to recite after eight weeks?



UNDERSTANDING THE PROBLEM

What do we know?

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 they know after eight weeks.

PLANNING AND COMMUNICATING A SOLUTION

To solve this problem, draw a table with 2 rows and 8 columns. (2 columns and 8 rows)

The first row should list the week numbers (1–8).

The second row should list the number of verses.

Week	1	2	3	4	5	6	7	8
Number of verses	1	3	6	10	15	21	28	36

The students would be able to recite 36 verses by the end of week 8.

REFLECTING AND GENERALIZING

The table makes it easy to see a pattern. If you discover the pattern right away, you can simply complete the pattern mentally to solve the problem.

EXTENSION

What if the students were not able to practice for one or two weeks?

How would this change the result?

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SIDE B

Introduction

Units: Problem-Solving Lessons *(cont.)*

□ **About the Problem-Solving Lesson** *(cont.)*

Applying the Strategy

Once the problem-solving 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 problem-solving lesson guides students through specific steps for solving the problem, using the strategy introduced earlier in the lesson.

The front of the card (Side A) 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) 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)

All three problems are provided on the Real-Life Problem-Solving Card. The problems use the same information given on the card and the same strategy introduced in the lesson. The problem-solving lessons guide the teacher through the process of using the Real-Life 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: These 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

Skill Application Games

☐ Reinforcing Skills

A set of 14 game boards is provided. These full-color games are ideal for centers and small-group interaction. The games are coordinated with the lesson units. They reinforce several skills taught within each unit. Many games are designed to make math content “real” to students by providing a real-life setting or a content area connection. Each game 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.

CD-ROM

☐ Sources for Printable Materials

A CD-ROM is included in the back of this guide. It can be used in both Windows and Macintosh formats. The CD-ROM 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 list of Differentiated-Group Skills Practice activities for the lesson.)
- **Reproducible Pages** from the last section of each unit
- **Additional Practice Pages** (Over 100 pages of student practice to reinforce the basic skills taught in each of the 7 units. Answer keys are included as well.)
- **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 Test

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 10 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. The Placement Test Answer Key is provided on page 70.

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 9 out of 10 correct on the Geometry test items, write in “9” 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 score 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 geometry items in the placement test, you should consider the Geometry unit a priority. See pages 25–27 for pacing plans.

Placement Test Unit 1

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 questions and answer choices carefully.

- Show your work in the question box. Use another sheet of paper if you need more room.
- 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.)
- Try completing all questions.

10

1 Which number means nine hundreds, seven tens, and two ones?

A 979
B 729
C 972
D 907

2 Ricardo hit a baseball 167 feet. Peter hit the ball 174 feet. Jamie hit the ball 101 feet. Colin hit the ball 143 feet. Who hit the ball the farthest?

F Ricardo
G Peter
H Jamie
J Colin

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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.).

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 student activity pages and Skill Application Game Cards.

⇒ About the Student Activity 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. The student activity pages can also be given as homework or classwork assignments to reinforce or review math skills covered during the year.

Prepare the student activity pages by downloading the pages from the CD-ROM. Assign student activity 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 games is to provide an interactive experience for students in a more real-life math setting. Many of the games have a content connection that ties the activity to the real world in some way. Two 11" x 17" game cards are included for each of the units. Unit titles are located on the game cards. One side of the card contains a full-color game board for use as a playing board. Playing directions and reproducible materials 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 129–144) 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 in the Extension section of the lesson.

Preparing the Cards

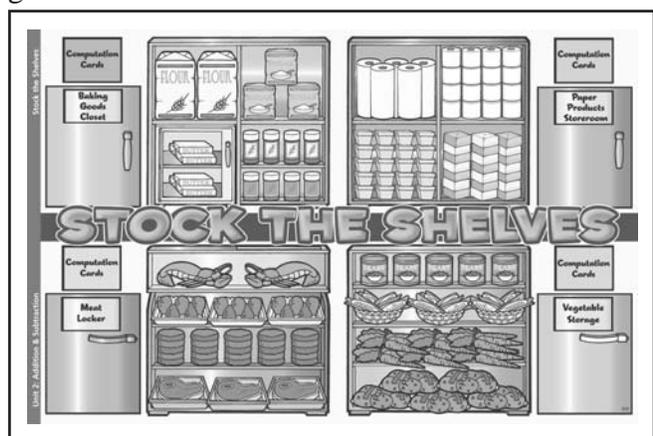
Read the information provided in the Skill Application Games section of this book. Reproduce the materials and prepare the game as directed. You may wish to copy and store the materials in resealable plastic bags or in envelopes and place them inside the folded game cards. Copy the student directions, 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 charts, base-10 blocks, and other manipulatives on hand as they play the games. For additional materials, see the reproducible pages of each of the units.

Using the Skill Application Games

Since the games are organized by unit, you can choose the appropriate games 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 play the games at the center. 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 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.



Stock the Shelves

An Activity for 2 to 4 Restaurant Owners

Addition and Subtraction Skills
add and subtract by 10 and 100, add a series of two-digit numbers

Materials
Dust the Shelves board copy of the Computation Card, Inventory Sheet for each player, game marker for each player, card

Background
Many restaurant owners make their stock orders on a daily basis. Each day, before opening, the stock checker checks what was left. In the game, students act as restaurant owners. As they move from stock room to stock room, their supplies will either decrease or increase (add or subtract).

Preparation

1. Copy the Computation Card onto heavy stock paper and cut them apart.
2. Place one set of cards with each child and add markers for the Computation Cards box of each stock room on the board. Be sure to mark up or down for each card set.
3. Copy the Inventory Sheet and make one game marker for each player.
4. Copy the Instructions for the Students and place it with the board.

Instructions for the Students

Objective
The objective is to be the restaurant owner at the end of the game with the most inventory.

Directions

1. The owner player will decide which stockroom to check (meat, stock, paper, etc.) and place a game marker on that box. He or she then selects a card from the pile in the stock room and shows the card's computation to the rest of inventory. There is no exception in the rest of your inventory sheet for your selection.
2. The other players go to this same stock room and complete the same steps as above. After everyone has completed the card, set the card up and return them to the stock room.
3. Next, the second player chooses a different stock room to enter and follows the same steps as above. The other players complete the same by entering the same stock room and showing computation card to the inventory team in that room.
4. Continue playing until every player has entered and adjusted his or her inventory in each of the four stock rooms.
5. This is a round. Round is finished with a round time. Showing a second computation card, and applying the computation to a different stock item. This time, the second player shows the number of the round.
6. Play a total of four rounds with different students going first in each round. By the end the player for each of your team should have changed.
7. At the end of four rounds, add all your stock items.
8. The winner is the player with the greatest total inventory.

© Teacher Created Materials, Inc. #8771 Math Activity Cards 105

Stock the Shelves

Computation Cards

+10	+10	+10	+10
-10	-10	-10	-10
+100	+100	+100	+100
-100	-100	-100	-100

Inventory Sheet

	Example: 12 boxes	± or -	New Total
Vegetables	121 cases of beans	100	221 papers
	200 bags of corn		
	120 cases		
Meats	500 packages		
	100 packages		
	200 packages		
Baking Goods	100 bags of flour		
	100 bags of sugar		
	100 cases of butter		
Paper Products	100 packages of paper		
	100 cases of paper		
	100 cases of paper		
Total of all items:			

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 units. 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.

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	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.	438 421 426 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. 426 421 438 421 426 438	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. Smallest Largest 252 256 272	356 472 372 Order these numbers. Smallest Largest 356 372 472	5,791 5,652 5,638 Order these numbers. Smallest Largest 5,638 5,652 5,791	3,791 3,692 3,638 Order these numbers. Smallest Largest 3,638 3,692 3,791
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	62,418 62,148 62,841 Order these numbers. Smallest Largest 62,148 62,418 62,841	Group Practice Identify each digit in a four-digit number. Practice ordering three-digit numbers. Practice writing four- and five-digit numbers in words.

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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.

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 from 2 to 4 Different Units

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.

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-2.12	Unit 2 L-2.7	Unit 4 L-4.4	Unit 4 L-4.11	Unit 5 L-5.2	Unit 5 L-5.9
Tues.	Placement Test	Unit 2 L-2.6	Unit 2 L-2.13	Unit 2 L-2.5	Unit 4 L-4.6	Unit 4 L-4.5	Unit 5 L-5.3	Unit 5 L-5.11
Wed.	Unit 2 L-2.1	Unit 2 L-2.8	Unit 2 L-2.15	Unit 4 L-4.1	Unit 4 L-4.7	Unit 4 L-4.8	Unit 5 L-5.5	Unit 5 L-5.12
Thurs.	Unit 2 L-2.2	Unit 2 L-2.9	Unit 2 L-2.18	Unit 4 L-4.2	Unit 4 L-4.9	Unit 4 L-4.12	Unit 5 L-5.6	Unit 5 L-5.13
Fri.	Unit 2 L-2.3	Unit 2 L-2.11	Unit 2 L-2.19	Unit 4 L-4.3	Unit 4 L-4.10	Unit 4 L-4.1	Unit 5 L-5.8	Unit 5 L-5.15

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 your eight-week program, 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 time for problem-solving practice, using the strategies learned in the unit.

Option C: Choose Lessons from All Units

Administer the Placement Test as suggested in Option A. If your intervention program (and/or the Placement Test scores) requires 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 17 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 needed 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 student activity 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.

Learning Objectives

- ✓ Read and write numbers to 100.
- ✓ Know what each digit represents in a two-digit number.
- ✓ Compare and order numbers to 100.

Resources

- pieces of paper about 3" x 4"
- Number Cards 1–100 (pages 176–180)
- Hundred Chart (page 175)
- Number Line 1–100 (pages 181–185)
- “Line Them Up!” (page 87)
- Pre-Test/Post-Test (page 88)

Pre-Test

1. Put these numbers in order from smallest to largest.
34, 23, 38, 42

2. Put these numbers in order from smallest to largest.
26, 19, 46, 32

A 34, 23, 42, 38 F 19, 26, 46, 32
B 23, 34, 42, 38 G 19, 26, 32, 46
C 38, 34, 23, 42 H 26, 19, 32, 46
D 23, 34, 38, 42 J 19, 32, 26, 46

Name _____

Post-Test

1. Put these numbers in order from smallest to largest.
25, 33, 42, 18

2. Put these numbers in order from smallest to largest.
22, 42, 35, 25

A 18, 25, 33, 42 F 22, 35, 25, 42
B 18, 33, 25, 42 G 22, 25, 42, 35
H 22, 25, 35, 42
J 25, 22, 35, 42

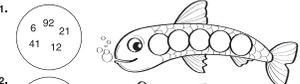
Name _____

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Line Them Up!

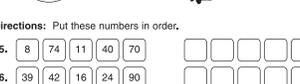
Name _____ Date _____

Directions: Put each creature's favorite numbers in order.

1. 

2. 

3. 

4. 

Directions: Put these numbers in order.

5.

8	74	11	40	70
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6.

39	42	16	24	90
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Mental Math and Number Sense Skills

Warm-Up Activity

1. Have students sit in mixed ability groups.
2. Ask them to each choose a number and write it on a piece of paper.
3. Tell them to hold up their number if it is the largest/smallest at their table, less/more than 100, between 20 and 40, and so on.
4. Repeat using similar instructions.
5. Finish the activity by asking the group to order the numbers within their groups.



Whole-Class Skills Lesson

If the Pre-Test (page 88 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 86), to teach this lesson.

1. Tell students, “Today we are going to compare and order numbers.”
2. Ask the students to give you five numbers between 1 and 100. Write each number on a card or piece of paper and display them randomly for the students to see.
3. Ask, “How can we compare these numbers to place them in order?” Encourage students to compare the place value of each digit.
4. Practice identifying the ones and tens places of each of the numbers.
5. Explain that since none of the numbers is over 100, we can compare digits in the tens place. Order the numbers from smallest to largest by comparing the digit in the tens place. The number with the lowest digit in the tens place is placed first, then the number with the second lowest digit in the tens place, and so on.
6. Once the numbers are in order, read them out loud with the students to check the work.
7. Ask students what they would do if the digits in the tens place were the same for two numbers (for example, 32 and 37). Tell students that if the digits in the tens place are the same, then they must compare the digits in the ones place. Practice comparing and ordering several numbers in which the digit in the tens place is the same.
8. Repeat the lesson, as time allows, by practicing to order five new numbers.



Differentiated-Group Skills Practice

Above Level – Teacher Directed

- Give each student a supply of pieces of paper about 3" x 4".
- Giving one criterion at a time, ask the students to write down a number that fits the description:

<input type="checkbox"/> number between 0 and 50	<input type="checkbox"/> number with eight ones
<input type="checkbox"/> number more than 50 but less than 100	<input type="checkbox"/> number greater than 100
<input type="checkbox"/> number with eight tens	<input type="checkbox"/> number greater than 85 but less than 100
- Students should use a new piece of paper each time so that they will have six differently numbered cards. The cards should then be placed facedown in the center of the table and shuffled around.
- Ask each student to take five cards, order them, and then record the order on a sheet of paper.
- They should then put the cards back, take five more, and order again.

Below Level – Student Directed

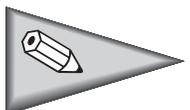
- Provide students with “Line Them Up!” (page 87) to complete. Allow students to work in pairs or use a hundred chart or number line for additional support.

On Level – Student Directed

- Provide students with number cards 1–100. Shuffle the cards.
- Have students choose five cards and order the cards. Students should record the order of the cards on a sheet of paper.
- Have the students repeat as time allows.

Lesson Review

Using the number cards 1–100, show any two cards and ask students to compare them based on a specific criterion (e.g., which number is greater or which number is smaller?).



Administer the Post-Test (page 88) at this time.
(See pages 8–11 for information.)

Extension

Ask students to have someone in their families write down a big and a small number. Students should then write down five numbers, in order, that are between these numbers.

Additional Extension Resources:

- CD-ROM Practice Pages: 11
- Skill Application Game: Can Do!

<p>7.3A-M7.11.1 Lesson 1.11</p> <p>Today's Lesson</p> <h2>Comparing and Ordering Numbers</h2> <p>MATH</p>	<p>7.3A-M7.11.1 Lesson 1.11</p> <p>Warm-Up Activity</p> <p>We will warm up today by playing a number game.</p> <p>MATH</p>	<p>7.3A-M7.11.1 Lesson 1.11</p> <p>Sit with people you do not normally work with.</p> <p>Choose a number with up to three digits and write it down on a piece of paper.</p> <p>Hold it up if it answers my questions.</p> <p>MATH</p>	<p>7.3A-M7.11.1 Lesson 1.11</p> <p>Hold up your number if it is:</p> <ul style="list-style-type: none"> • the largest on your table • the smallest on your table • less than 100 • more than 100 • between 20 and 40 <p>MATH</p>						
<p>7.3A-M7.11.1 Lesson 1.11</p> <p>Work together and order the numbers.</p> <p>MATH</p>	<p>7.3A-M7.11.1 Lesson 1.11</p> <p>Whole-Class Skills Lesson</p> <p>Today we are going to compare and order numbers.</p> <p>MATH</p>	<p>7.3A-M7.11.1 Lesson 1.11</p> <p>Let's choose five numbers between 0 and 100.</p> <p>27 67 84 34 19</p> <p>MATH</p>	<p>7.3A-M7.11.1 Lesson 1.11</p> <p>How can we compare these numbers to place them in order?</p> <p>27 67 84 34 19</p> <p>We can look at the tens place to begin comparing the numbers.</p> <p>MATH</p>						
<p>7.3A-M7.11.1 Lesson 1.11</p> <p>Order them from smallest to largest.</p> <p>19 21 28 62 68</p> <p>MATH</p>	<p>7.3A-M7.11.1 Lesson 1.11</p> <p>Let's choose five different numbers between 0 and 100.</p> <p>21 62 68 28 15</p> <p>MATH</p>	<p>7.3A-M7.11.1 Lesson 1.11</p> <p>How can we compare these numbers to place them in order?</p> <p>21 62 68 28 15</p> <p>What do we have to do now that some of the numbers have the same number in the tens place?</p> <p>MATH</p>	<p>7.3A-M7.11.1 Lesson 1.11</p> <p>Order them from smallest to largest.</p> <p>15 27 34 67 84</p> <p>MATH</p>						
<p>7.3A-M7.11.1 Lesson 1.11</p> <p>On a piece of paper, write down 5 numbers between 1-100.</p> <p>Exchange your numbers with a classmate.</p> <p>Order the numbers on the paper from least (smallest) to greatest (largest).</p> <p>MATH</p>	<p>7.3A-M7.11.1 Lesson 1.11</p> <p>Group Work</p> <table border="1"> <tr> <td></td> <td>Order a set of numbers that meet different criteria.</td> </tr> <tr> <td></td> <td>Order a set of numbers.</td> </tr> <tr> <td></td> <td>Order numbers with the help of a hundred chart or a number line.</td> </tr> </table> <p>MATH</p>		Order a set of numbers that meet different criteria.		Order a set of numbers.		Order numbers with the help of a hundred chart or a number line.		
	Order a set of numbers that meet different criteria.								
	Order a set of numbers.								
	Order numbers with the help of a hundred chart or a number line.								

Line Them Up!

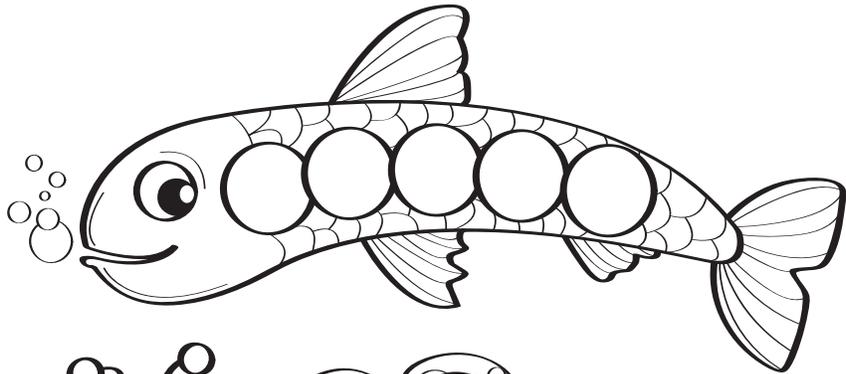
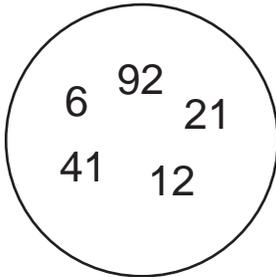
1.11

Name _____

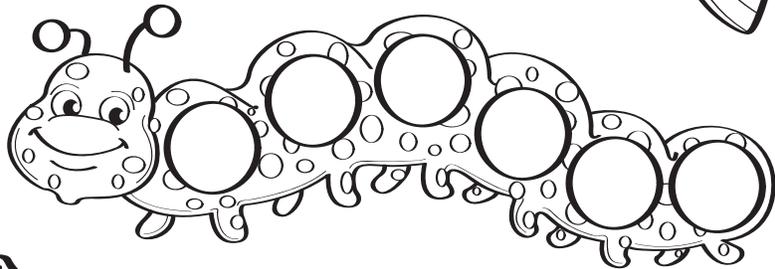
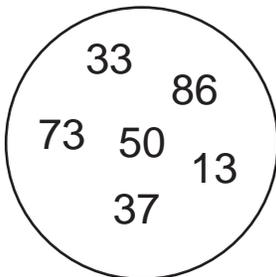
Date _____

Directions: Put each creature's favorite numbers in order.

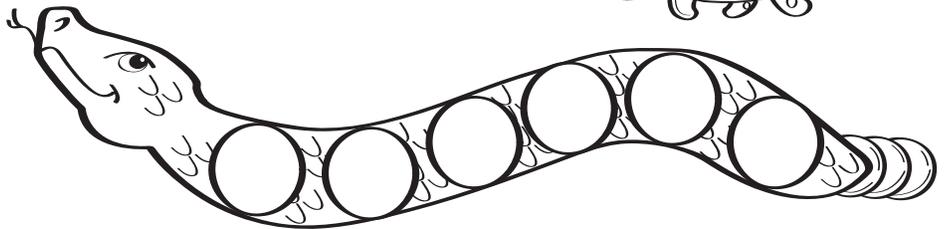
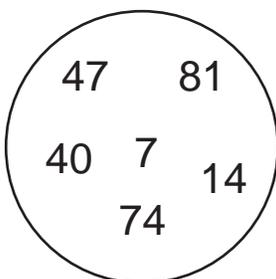
1.



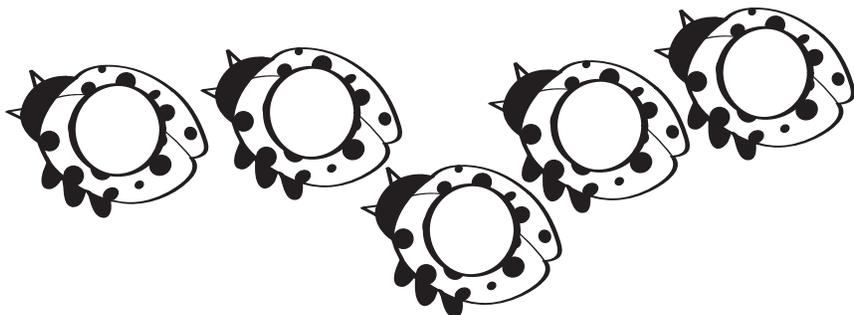
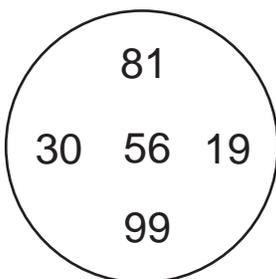
2.



3.

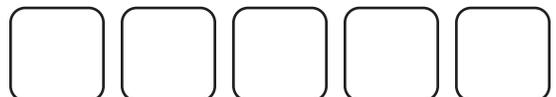


4.

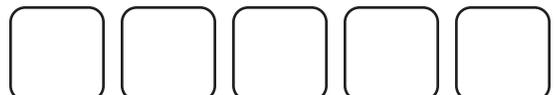


Directions: Put these numbers in order.

5.



6.



Pre-Test

1 Put these numbers in order from smallest to largest.

34, 23, 38, 42

A 34, 23, 42, 38

B 23, 34, 42, 38

C 38, 34, 23, 42

D 23, 34, 38, 42

2 Put these numbers in order from smallest to largest.

26, 19, 46, 32

F 19, 26, 46, 32

G 19, 26, 32, 46

H 26, 19, 32, 46

J 19, 32, 26, 46

Name

2

Post-Test

1 Put these numbers in order from smallest to largest.

25, 33, 42, 18

A 18, 25, 33, 42

B 18, 33, 25, 42

C 25, 18, 33, 42

D 18, 33, 42, 25

2 Put these numbers in order from smallest to largest.

22, 42, 35, 25

F 22, 35, 25, 42

G 22, 25, 42, 35

H 22, 25, 35, 42

J 25, 22, 35, 42

Name

2

Real-Life Problem-Solving Lesson

Using Strategies to Solve Real-Life Problems

Resources

- ✓ Problem-Solving Strategy Card and transparencies: “Drawing a Diagram”
- ✓ Real-Life Problem-Solving Card and transparencies: “Springtime”
- ✓ 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: Drawing a Diagram

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 “Drawing a Diagram.” Discuss the information in the box, reinforcing reasons why drawing a diagram can be a useful tool for solving problems.
2. Discuss the rest of the information on the page. Ask students to explain how drawing a picture or diagram helped them visualize the information. Point out that without a visual image, some students may have answered incorrectly.
3. Place the transparency for Side B of the strategy card, “Drawing a Diagram,” 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 drawing a diagram or picture in order to help them find the solution to a problem.
2. Review with students how to draw a diagram. Suggest that when drawing a diagram, students should begin by identifying the information that is already in the problem. Ask students to try to picture what is happening in the problem so they can draw an accurate but quick representation.
3. In order to use the strategy of drawing a diagram 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, highlighting, or making a quick list of the information from the problem may help to find the solution.

Real-Life Problem-Solving Lesson

Using Strategies to Solve Real-Life Problems

Applying the Strategy

Real-Life Problem-Solving Card: “Springtime”

UNDERSTANDING THE PROBLEM

Getting Ready

- Place the transparency for Side A of “Springtime” on an overhead projector.
- Together, read and discuss the information on Side A of the problem-solving card. Ask students questions, such as “Do you plant flowers during spring? Do you have a favorite flower?” 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 the card. They will use the strategy of drawing a diagram 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 problems. Students may have to reread “Springtime” in order to locate some of the key information. Also, as the problem is reread, help them identify key words that may indicate what operation(s) will be needed in order to solve the problem.

Problem A

Looking at the garden on the front of the card, it shows that Sue planted 2 purple flowers. Then she planted 4 red flowers. Then she planted 6 yellow flowers.

Problem B

Looking at the garden on the front of the card, it shows that Sue planted 2 purple flowers. Then she planted 4 red flowers. Then she planted 6 yellow flowers.

Problem C

Looking at the garden on the front of the card, it shows that Sue planted 2 purple flowers. Then she planted 4 red flowers. Then she planted 6 yellow flowers.

What do I need to find out?

- Identify what question needs to be answered when solving the problem.

Problem A

How many purple flowers must be planted next?

Problem B

How many purple flowers must be planted next?
Then how many red flowers must be planted?

Problem C

How many purple flowers must be planted next?
Then how many red flowers must be planted?
How many yellow flowers have been planted?

Real-Life Problem-Solving Lesson

Using Strategies to Solve Real-Life Problems

Applying the Strategy *(cont.)*

Real-Life Problem-Solving Card: “Springtime” *(cont.)*

○ PLANNING AND COMMUNICATING A SOLUTION

Solving the Problem

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

For all three of these problems, have students draw the flowers using purple, red, and yellow crayons or markers. Have the students continue the pattern by drawing the flowers.

Problem A

The students should determine the number of each flower color in the pattern.

Problem B

The students should determine the number of each flower color in the pattern.

Problem C

The students should determine the number of each flower color in the pattern.

Solutions

Two solutions are possible. Students may have continued the pattern as an ABC pattern (For example, 2 purple, 4 red, 6 yellow, 2 purple, 4 red, 6 yellow). Another possible solution is shown below.

Problem A

The garden on the front of the card has the pattern of 2 purple flowers then 4 red flowers then 6 yellow flowers. Looking at the numbers, the students should determine that the next number is 8. Looking at the colors, the students should determine that purple flowers will come next. The answer is 8 purple flowers.

Problem B

The garden on the front of the card has the pattern of 2 purple flowers then 4 red flowers then 6 yellow flowers. Looking at the numbers, the students should determine that the pattern is multiples of 2. Looking at the colors, the students should determine that the alternating colors are purple, red, and yellow. The set of flowers after 6 yellow flowers is 8 purple flowers then 10 red flowers. Six yellow flowers have been planted so far.

Problem C

The garden on the front of the card has the pattern of 2 purple flowers then 4 red flowers then 6 yellow flowers. Looking at the numbers, the students should determine that the pattern is multiples of 2. Looking at the colors, the students should determine that the alternating colors are purple, red, and yellow. The set of flowers after 6 yellow flowers is 8 purple flowers then 10 red flowers.

Real-Life Problem-Solving Lesson

Using Strategies to Solve Real-Life Problems

Applying the Strategy *(cont.)*

Real-Life Problem-Solving Card: “Springtime” *(cont.)*

REFLECTING AND GENERALIZING

Problem A

Students should review their diagrams and answers to be sure they make sense. Have students check their diagrams to be sure they completed the patterns correctly. Ask students to identify the number pattern and color pattern.

Problem B

Students should review their diagrams and answers to be sure they make sense. Have students check their diagrams to be sure they completed the patterns correctly. Ask students to identify the number pattern and color pattern.

Problem C

Students should review their diagrams and answers to be sure they make sense. Have students check their diagrams to be sure they completed the patterns correctly. Ask students to identify the number pattern and color pattern.

EXTENSIONS

Use the Class Challenge to solve an additional problem related to the topic. Continue the pattern until you end with 14 purple flowers. How many red flowers were planted? (14) How many yellow flowers were planted? (18)

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, the information often shows a pattern, or part of a solution, which can then be completed.

Using a table can help keep track of the information and reduce the chance of making mistakes or repeating something.

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

Planning Your Table

- First, decide what information is included in the problem.
- Next, decide whether you want to show the information in a row or a column. Be sure you understand what the table is going to tell you.
- Headings are also important because they show the exact contents of the table.

Hint: In this problem, you worked with multiples of 10. When working with multiples, a table can help you find patterns.

Example: *Research shows that 3 out of every 10 people have blonde hair.*

How many blondes can be found in 50 people?

For this problem, you need to make a table with two columns: **Number of Blondes** and **Number of People**.

Number of Blondes	Number of People
3	10
6	20
9	30
12	40
15	50

Using the Strategy

Sample Problem

Mrs. Stone is 35 years old. Her son Ty is 7 years old.

How old will Ty be when his mom is 42?

Mrs. Stone **Ty**

35	7
36	8
37	9
38	10
39	11
40	12
41	13
42	14

UNDERSTANDING THE PROBLEM

What do we know?

Mrs. Stone is 35 now.

Ty is 7 now.

They will both get one year older every year.

What do we need to find out?

How old will Ty be when Mrs. Stone is 42?

PLANNING AND COMMUNICATING A SOLUTION

To solve this problem, draw a table with two columns.

Write “Mrs. Stone” above one column. Write “Ty” above the other column.

Write Mrs. Stone’s age from 35 to 42 in one column (from top to bottom). How many rows do you need?

Then write Ty’s ages in the other column.

Do you see the answer?

Ty will be 14 years old when Mrs. Stone is 42.

REFLECTING AND GENERALIZING

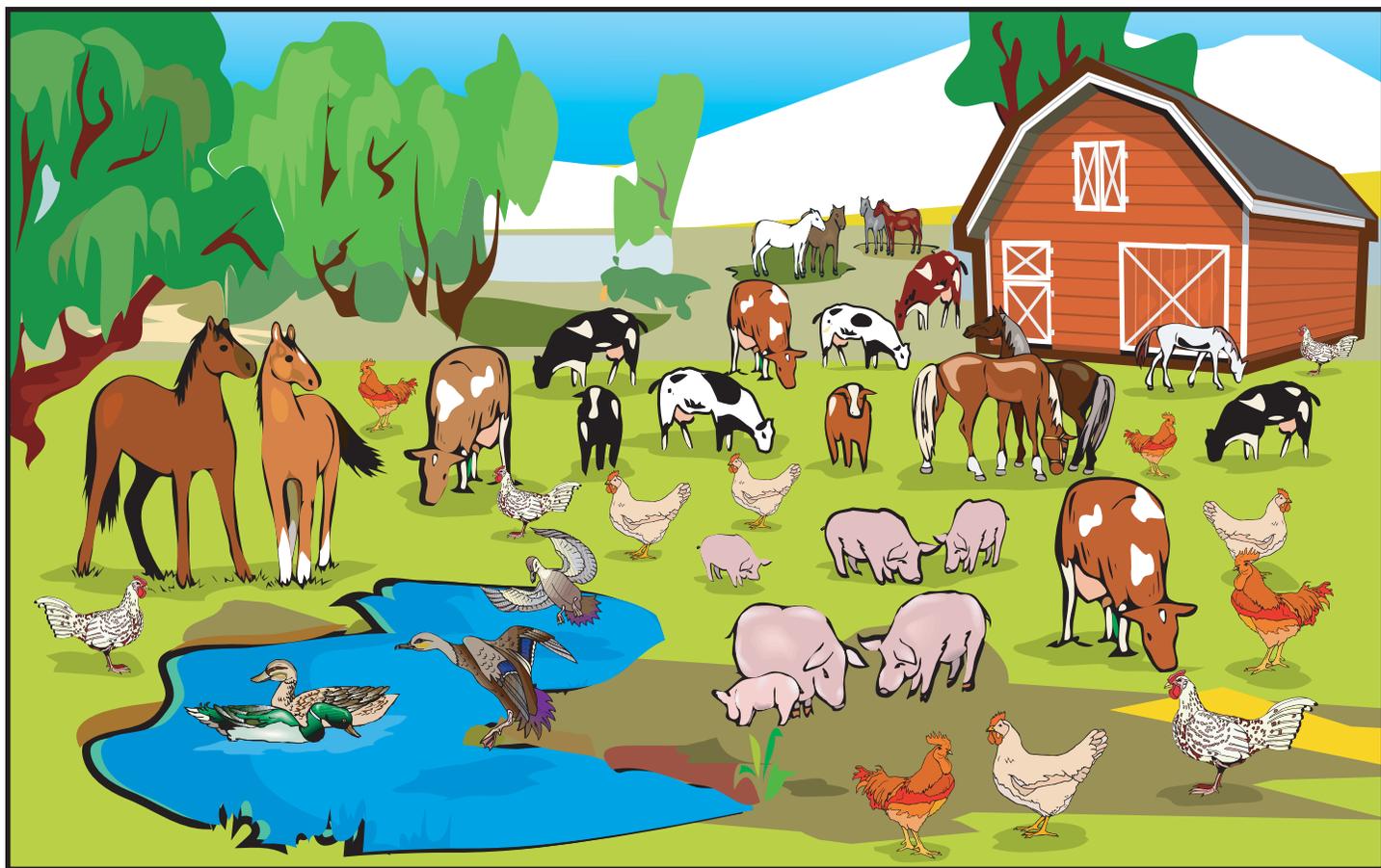
The table makes it easy to see a pattern. If you see the pattern right away, you can find the answer easily.

EXTENSION

How old will Mrs. Stone be when Ty is 20 years old?

Extend the table to find the answer.

On the Farm



Mrs. Farmer's class was very excited to be taking a trip to the Green Family Farm. Many of the students in the class had never been to a farm before. Harold was still asking Mrs. Farmer questions. Harold had been asking questions since the class found out they were going to the farm.

"Will we see elephants?" asked Harold.

"No, Harold. We won't be seeing any elephants," said Mrs. Farmer patiently.

"Will we get to milk a cow or bale hay?" asked Harold.

Mrs. Farmer considered Harold's question and said, "I am not sure Harold. Maybe Farmer Green will allow us to milk a cow or bale hay. We will just have to find out when we get there."

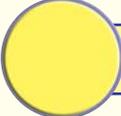
No one blamed Harold for asking too many questions because many of the students in class had the same questions.

"Alright, time to go. Everyone find his or her trip buddy. Load up the buses and we will be off," said Mrs. Farmer.

At the farm, the class saw many wonderful animals. Everyone got to try milking a cow. Some of the students were surprised that the milk wasn't cold like it is at home. They learned all about farm life. One of the things they learned was how the farmer has to keep track of the animals on his farm. This helps him decide how much food he will need or how much medicine he needs for the animals.

Can you help him before the class leaves the farm for the day?

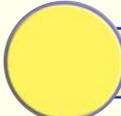
On the Farm


WHAT IS THE PROBLEM?

The farmer keeps track of all the animals on his farm, but he needs some help getting organized. You will help him by creating a table and a bar graph of the animals on his farm.

Use the information on the front 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. Think about how you will draw your table and what you will include in it.

Remember: If you have trouble planning ways to solve the problem, reread it and rethink your strategy. When you have a solution, think about whether your answer makes sense.


PROBLEM-SOLVING STRATEGY: DRAWING A TABLE

Problem A

The farmer wants to keep track of the animals on his farm. Help him by making a table of the animals on the farm. Which animal does the farmer have the most of? Which animal does the farmer have the least of? Use the table to make a bar graph of the animals on the farm.

Hint: Make a table with two columns. The first column is for the animal name. The second column is for the number of animals.


Problem B

The farmer wants to keep track of the animals on his farm. Help him by making a table of the animals on the farm. Use the table to make a bar graph of the animals on the farm. Name the animals from least to greatest. Which animal does the farmer have the most of? Which animal does the farmer have the least of?

Hint: Make a table with two columns.


Problem C

Help the farmer keep track of his animals by drawing a table. Use the table to make a bar graph of the animals on the farm. Does the farmer have more horses or cows on the farm? How many more does he have? How many two-legged animals are on the farm?

Hint: Use your table or bar graph to compare the number of animals.

Class Challenge

The farmer has decided to buy more animals for his farm. How many of each animal would the farmer need to buy to double his stock?