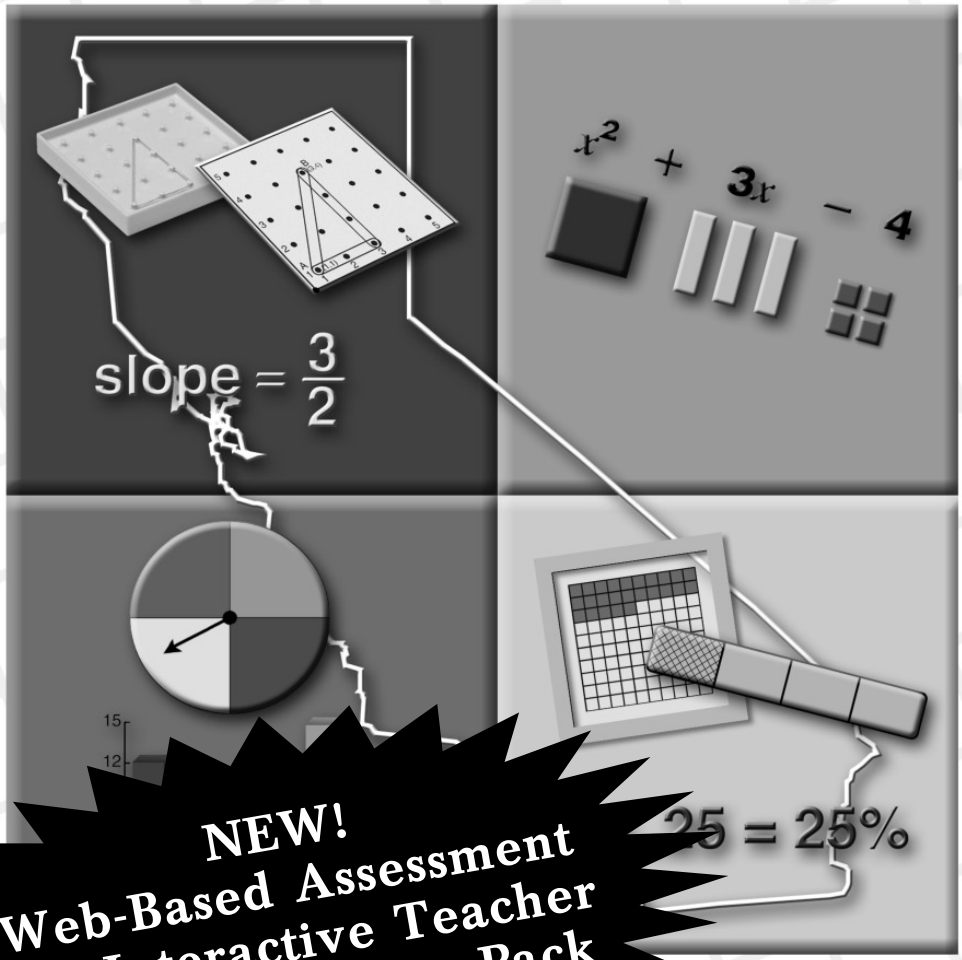
Sampler

MOVING with MATH®

SUMS for HIGH SCHOOL



NEW!
Web-Based Assessment and Interactive Teacher Resource Printing Pack

A Complete Program for High School Success

Math Teachers Press, Inc.

A Complete Program for High School Success

Each set comes with a complete Teacher Manual and student books. Manipulatives are the only items to purchase separately.

Student Activity Books

- 220 activity pages that correspond to lessons in the Teacher Manual.
- Checkpoint exams in the middle of each half of the book.
- Every student page models a concept, then follows with math practice.

Teacher Manuals

- Step-by-step lessons for every student page with lightly scripted hands-on activities.
- 176 *Skill Builders* reteaching pages correlated to state content standards. Reproducible.
- 88 regular 5-question reviews that cover all content standards. Reproducible.
- Pre- and Post-Tests for Part I and Part II.

Curriculum Description

Purpose

The *SUMS* program **teaches** — not just reviews — all concepts and skills needed for success in high school math, to move on to Algebra I or to graduate.

The *Moving with Math*® curriculum uses developmentally appropriate lessons to help underprepared students build a **knowledge bank** as they make the transition from the concrete to the abstract mode of learning. Easy-to-follow, lightly scripted lesson plans direct the use of manipulatives.

Time Frame Options

The Teacher Manual provides pacing plans for one-semester, one-year and two-year periods to meet the needs of all students.

Organization

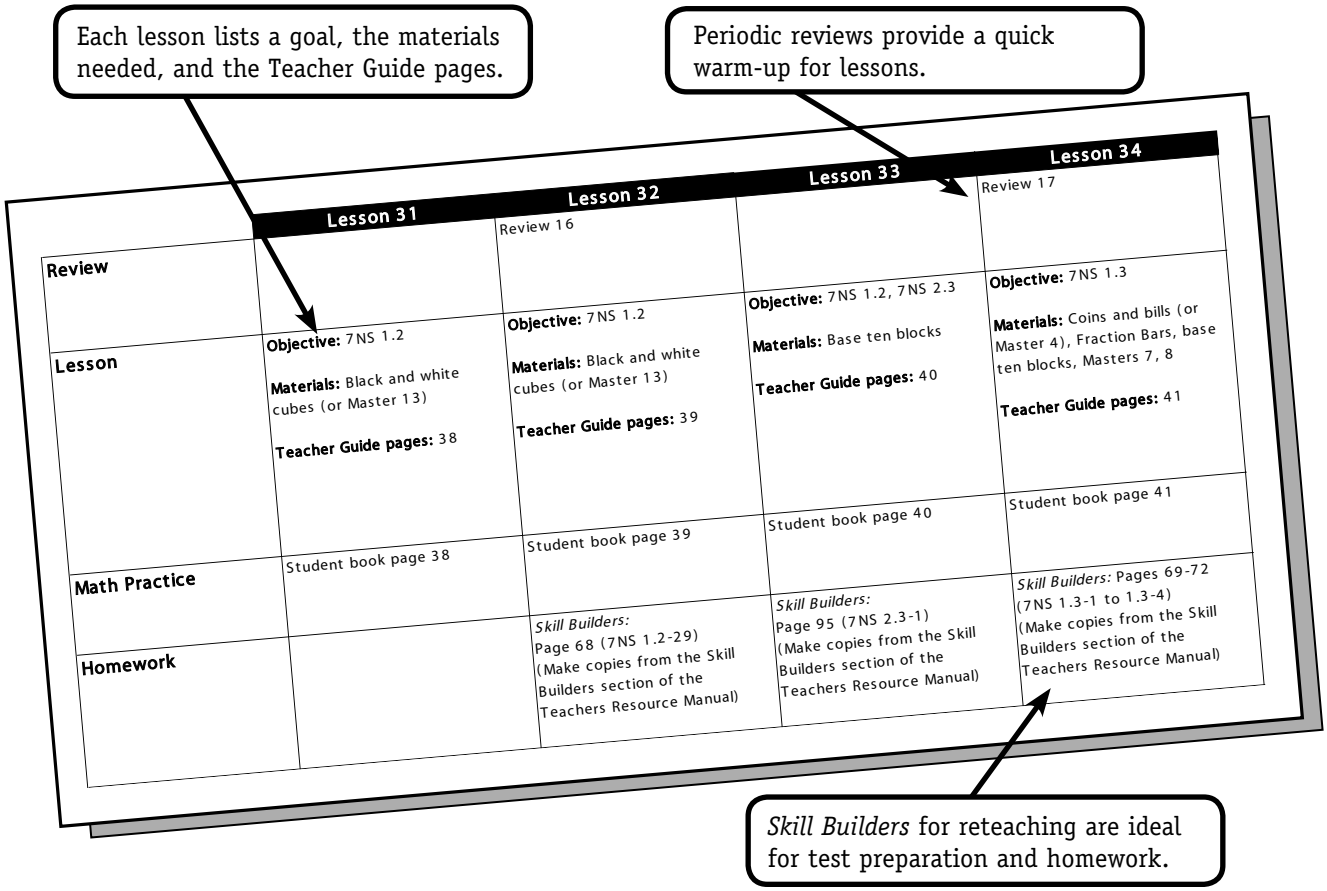
Topics covered by the *SUMS* program are divided into two parts. Part I covers Number Sense, Operations, Reasoning, Geometry and Measurement. Part II covers Probability, Statistics, Data Analysis, Functions and Algebra I.

Easy, Ongoing Assessment

Each part has a Pre-Test and Post-Test matched to the same content standards tested on state exit exams. Diagnostic/ prescriptive reports for an individualized learning plan are included, and progress is continuously monitored with warm-up reviews of previously taught concepts. Reteaching pages follow up with extra practice and homework.

Pacing Instruction

Student achievement rises when teachers are organized and students move at a reasonable pace. Pacing calendars help teachers stay on track. The Teacher Guide contains 90-day, 180-day and 2-year calendars to meet a variety of student needs.



	Lesson 31	Lesson 32	Lesson 33	Lesson 34
Review		Review 16		Review 17
Lesson	**Objective:** 7NS 1.2 **Materials:** Black and white cubes (or Master 13) **Teacher Guide pages:** 38	**Objective:** 7NS 1.2 **Materials:** Black and white cubes (or Master 13) **Teacher Guide pages:** 39	**Objective:** 7NS 1.2, 7NS 2.3 **Materials:** Base ten blocks **Teacher Guide pages:** 40	**Objective:** 7NS 1.3 **Materials:** Coins and bills (or Master 4), Fraction Bars, base ten blocks, Masters 7, 8 **Teacher Guide pages:** 41
Math Practice	Student book page 38	Student book page 39	Student book page 40	Student book page 41
Homework		*Skill Builders:* Page 68 (7NS 1.2-29) (Make copies from the Skill Builders section of the Teachers Resource Manual)	*Skill Builders:* Page 95 (7NS 2.3-1) (Make copies from the Skill Builders section of the Teachers Resource Manual)	*Skill Builders:* Pages 69-72 (7NS 1.3-1 to 1.3-4) (Make copies from the Skill Builders section of the Teachers Resource Manual)

A Typical Lesson

Warming Up

Students work a 5-question review. The teacher reads answers as students correct their work and record results on a record sheet that identifies the objective being tested by each question.

The Lesson

Students engage in a directed manipulative-based activity **OR** the teacher displays manipulatives on an overhead to develop understanding of each math concept. Students then complete an activity page to practice the concept.

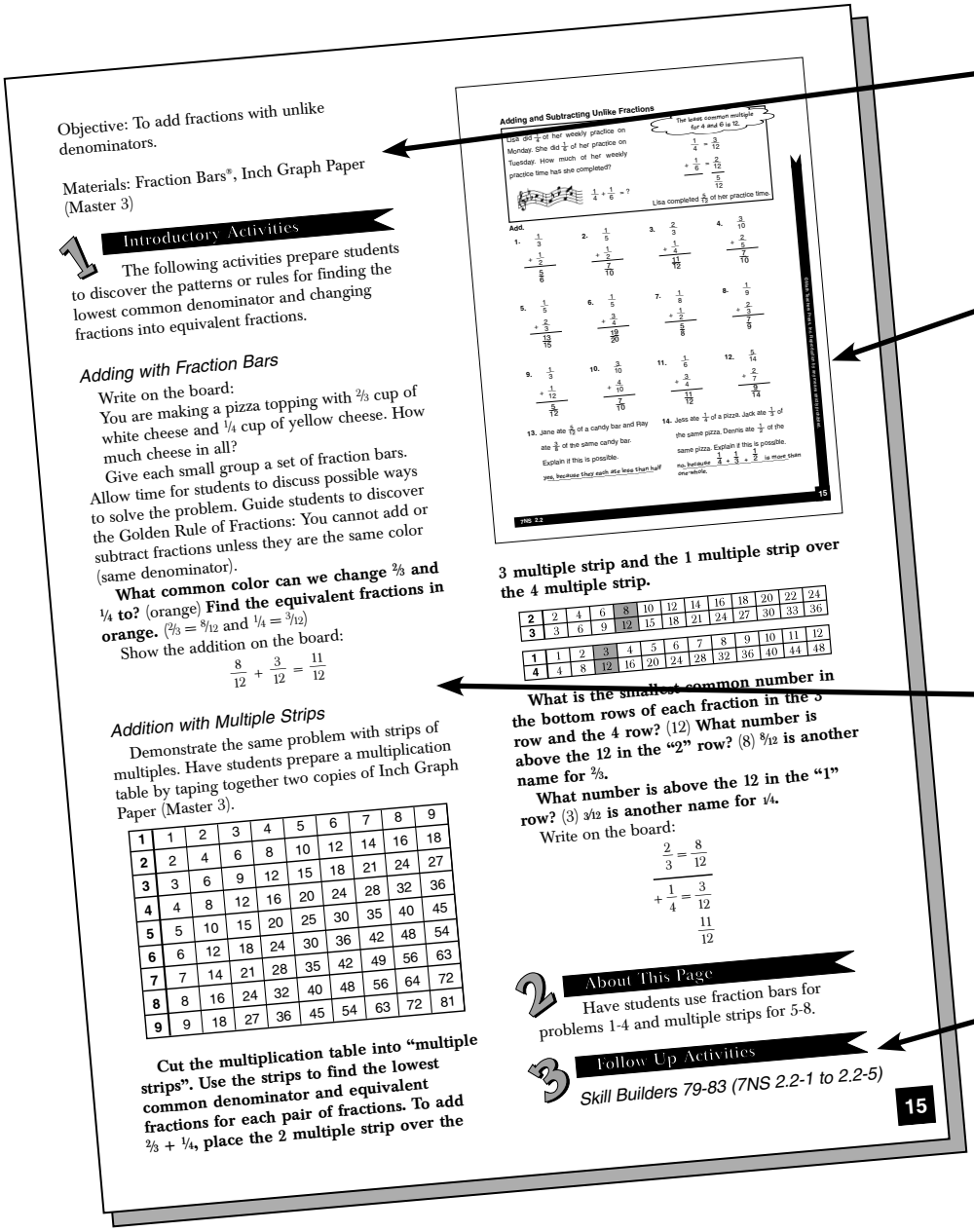
Homework/Test Preparation

Teachers prescribe additional practice related to the objective. Homework assignments are suggested in the calendar **OR** teachers may assign homework to match questions missed by students on reviews. The *Skill Builders* section in the Teacher Manual contains 176 reproducible practice pages for homework.

Visit www.movingwithmath.com for more information.

Friendly Lesson Pages

"Everything the teacher needs to do and say is here."



Objective: To add fractions with unlike denominators.

Materials: Fraction Bars®, Inch Graph Paper (Master 3)

1 Introductory Activities

The following activities prepare students to discover the patterns or rules for finding the lowest common denominator and changing fractions into equivalent fractions.

Adding with Fraction Bars

Write on the board:
You are making a pizza topping with 2/3 cup of white cheese and 1/4 cup of yellow cheese. How much cheese in all?

Give each small group a set of fraction bars. Allow time for students to discuss possible ways to solve the problem. Guide students to discover the Golden Rule of Fractions: You cannot add or subtract fractions unless they are the same color (same denominator).

What common color can we change 2/3 and 1/4 to? (orange) **Find the equivalent fractions in orange.** ($^2/_3 = {}^8/_{12}$ and $^1/_4 = {}^3/_{12}$)

Show the addition on the board:

$$\frac{8}{12} + \frac{3}{12} = \frac{11}{12}$$

Addition with Multiple Strips

Demonstrate the same problem with strips of multiples. Have students prepare a multiplication table by taping together two copies of Inch Graph Paper (Master 3).

1	1	2	3	4	5	6	7	8	9
2	2	4	6	8	10	12	14	16	18
3	3	6	9	12	15	18	21	24	27
4	4	8	12	16	20	24	28	32	36
5	5	10	15	20	25	30	35	40	45
6	6	12	18	24	30	36	42	48	54
7	7	14	21	28	35	42	49	56	63
8	8	16	24	32	40	48	56	64	72
9	9	18	27	36	45	54	63	72	81

Cut the multiplication table into "multiple strips". Use the strips to find the lowest common denominator and equivalent fractions for each pair of fractions. To add 2/3 + 1/4, place the 2 multiple strip over the 3 multiple strip and the 1 multiple strip over the 4 multiple strip.

2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36

1	1	2	3	4	5	6	7	8	9	10	11	12
4	4	8	12	16	20	24	28	32	36	40	44	48

What is the smallest common number in the bottom rows of each fraction in the 3 row and the 4 row? (12) **What number is above the 12 in the "2" row?** (8) **8/12 is another name for 2/3.**

What number is above the 12 in the "1" row? (3) **3/12 is another name for 1/4.**

Write on the board:

$$\frac{\frac{2}{3} = \frac{8}{12}}{+\frac{1}{4} = \frac{3}{12}}$$
$$\frac{11}{12}$$

2 About This Page

Have students use fraction bars for problems 1-4 and multiple strips for 5-8.

3 Follow Up Activities

Skill Builders 79-83 (7NS 2.2-1 to 2.2-5)

15

Each page begins with the lesson objective and the materials needed.

Each Teacher Guide lesson page shows the corresponding student page with answers.

On this page, students use equivalent fractions to find the amount of cheese on a pizza, then use multiple strips as models.

Extra practice pages are ideal to send home. These *Skill Builders* (pp. 79-83) teach Number Sense standard 2.2 on SUMS.

The anatomy of a lesson page

Teacher Guides provide lessons for each of the 220 pages in the student book.

1 **Introductory Activities** provide guided exploration with real-world models or manipulatives.

2 **About This Page** connects math work to practice in the student activity book.

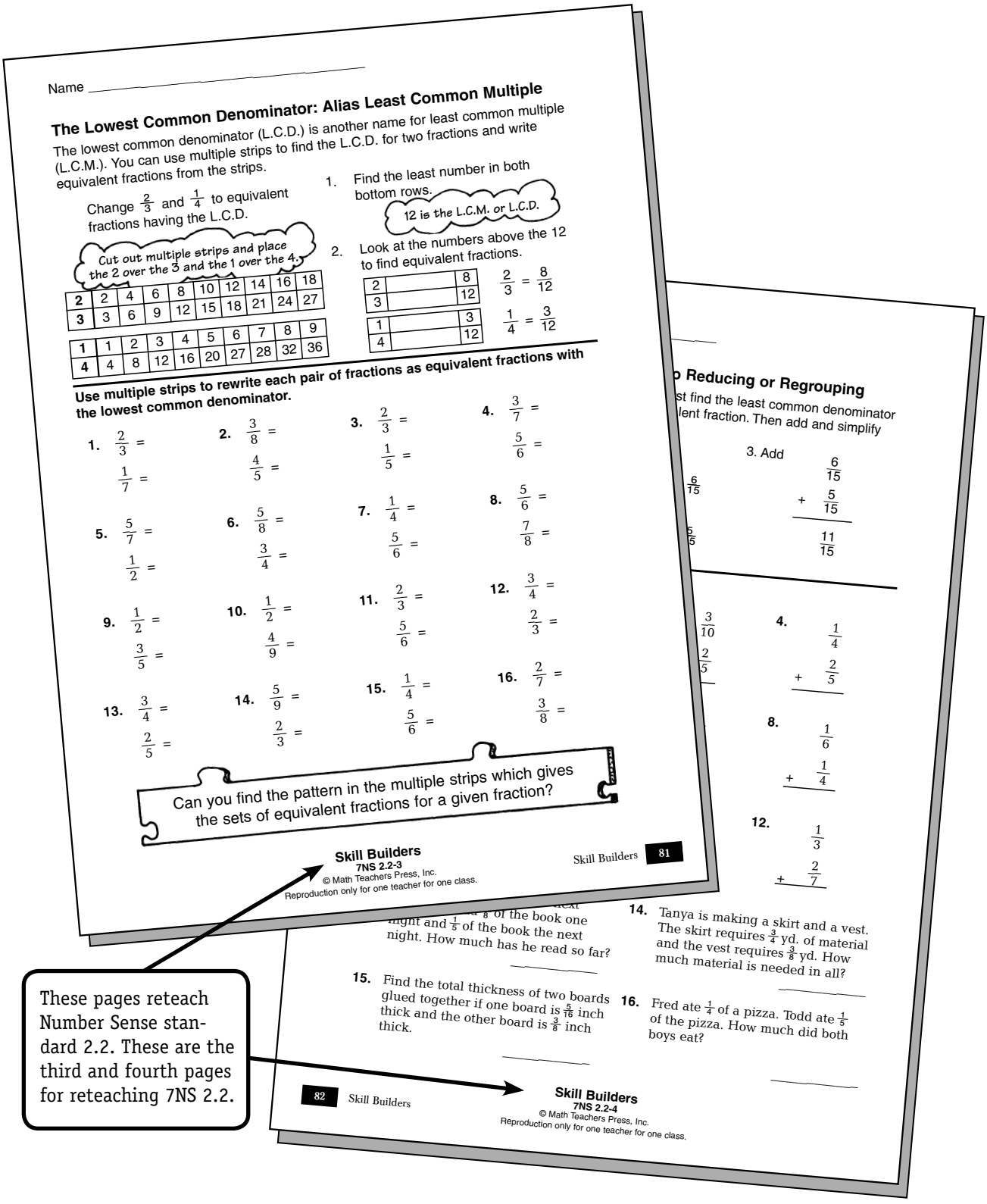
3 **Follow Up Activities** provide reteaching pages and other extension activities.

Call (800) 852-2435 for more information.

Skill Builders

Extra Practice Ideal for Homework

The Teachers Resource Manual contains over 170 reproducible pages matched to the content standards. These additional resources are referenced on lesson pages (see opposite page).



Name _____

The Lowest Common Denominator: Alias Least Common Multiple

The lowest common denominator (L.C.D.) is another name for least common multiple (L.C.M.). You can use multiple strips to find the L.C.D. for two fractions and write equivalent fractions from the strips.

Change $\frac{2}{3}$ and $\frac{1}{4}$ to equivalent fractions having the L.C.D.

Cut out multiple strips and place the 2 over the 3 and the 1 over the 4.

2	2	4	6	8	10	12	14	16	18
3	3	6	9	12	15	18	21	24	27

1	1	2	3	4	5	6	7	8	9
4	4	8	12	16	20	27	28	32	36

1. Find the least number in both bottom rows.

12 is the L.C.M. or L.C.D.

2. Look at the numbers above the 12 to find equivalent fractions.

2		8
3		12

$\frac{2}{3} = \frac{8}{12}$

1		3
4		12

$\frac{1}{4} = \frac{3}{12}$

Use multiple strips to rewrite each pair of fractions as equivalent fractions with the lowest common denominator.

1. $\frac{2}{3} =$ $\frac{1}{7} =$
2. $\frac{3}{8} =$ $\frac{4}{5} =$
3. $\frac{2}{3} =$ $\frac{1}{5} =$
4. $\frac{3}{7} =$ $\frac{5}{6} =$
5. $\frac{5}{7} =$ $\frac{1}{2} =$
6. $\frac{5}{8} =$ $\frac{3}{4} =$
7. $\frac{1}{4} =$ $\frac{5}{6} =$
8. $\frac{5}{6} =$ $\frac{7}{8} =$
9. $\frac{1}{2} =$ $\frac{3}{5} =$
10. $\frac{1}{2} =$ $\frac{4}{9} =$
11. $\frac{2}{3} =$ $\frac{5}{6} =$
12. $\frac{3}{4} =$ $\frac{2}{3} =$
13. $\frac{3}{4} =$ $\frac{2}{5} =$
14. $\frac{5}{9} =$ $\frac{2}{3} =$
15. $\frac{1}{4} =$ $\frac{5}{6} =$
16. $\frac{2}{7} =$ $\frac{3}{8} =$

Can you find the pattern in the multiple strips which gives the sets of equivalent fractions for a given fraction?

Skill Builders
7NS 2.2-3

o Reducing or Regrouping

st find the least common denominator
lent fraction. Then add and simplify

3. Add

$\frac{6}{15}$
$+ \frac{5}{15}$
$\frac{11}{15}$

$\frac{3}{10}$

4. $\frac{1}{4}$ $+ \frac{2}{5}$

8. $\frac{1}{6}$ $+ \frac{1}{4}$

12. $\frac{1}{3}$ $+ \frac{2}{7}$

night and $\frac{1}{5}$ of the book the next night. How much has he read so far?

14. Tanya is making a skirt and a vest. The skirt requires $\frac{3}{4}$ yd. of material and the vest requires $\frac{3}{8}$ yd. How much material is needed in all?

15. Find the total thickness of two boards glued together if one board is $\frac{5}{16}$ inch thick and the other board is $\frac{3}{8}$ inch thick.

16. Fred ate $\frac{1}{4}$ of a pizza. Todd ate $\frac{1}{5}$ of the pizza. How much did both boys eat?

Skill Builders
7NS 2.2-4

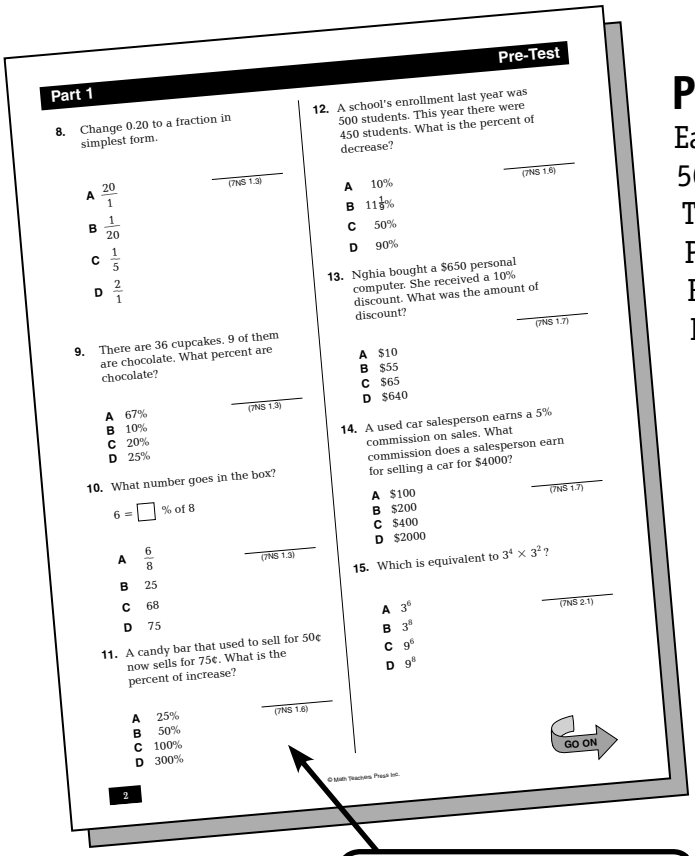
These pages reteach Number Sense standard 2.2. These are the third and fourth pages for reteaching 7NS 2.2.

Visit www.movingwithmath.com to learn more.

Complete Assessment

"The Pre-Test/Post-Test works great. I could identify by each problem those students needing the most work."

Pilot Teacher


Part 1 — Pre-Test

8. Change 0.20 to a fraction in simplest form. (7NS 1.3)
A $\frac{20}{1}$ B $\frac{1}{20}$ C $\frac{1}{5}$ D $\frac{2}{1}$

9. There are 36 cupcakes. 9 of them are chocolate. What percent are chocolate? (7NS 1.3)
A 67% B 10% C 20% D 25%

10. What number goes in the box? $6 = \square$ % of 8 (7NS 1.3)
A $\frac{6}{8}$ B 25 C 68 D 75

11. A candy bar that used to sell for 50¢ now sells for 75¢. What is the percent of increase? (7NS 1.6)
A 25% B 50% C 100% D 300%

12. A school's enrollment last year was 500 students. This year there were 450 students. What is the percent of decrease? (7NS 1.6)
A 10% B 11$\frac{1}{9}$% C 50% D 90%

13. Nghia bought a $650 personal computer. She received a 10% discount. What was the amount of discount? (7NS 1.7)
A $10 B $55 C $65 D $640

14. A used car salesperson earns a 5% commission on sales. What commission does a salesperson earn for selling a car for $4000? (7NS 1.7)
A $100 B $200 C $400 D $2000

15. Which is equivalent to $3^4 \times 3^2$? (7NS 2.1)
A 3^6 B 3^8 C 9^6 D 9^8

GO ON

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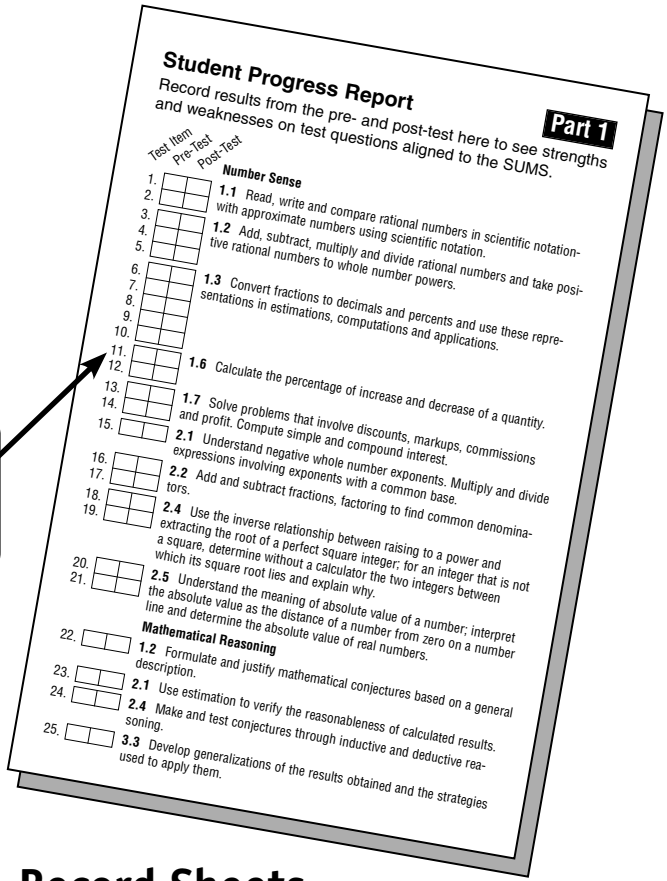
2

Pre- and Post-Tests

Each Teacher Manual contains 50-question reproducible Pre- and Post-Tests for each part of the curriculum. Part 1 covers Number Sense, Operations, Reasoning, Geometry and Measurement. Part 2 covers Probability, Statistics, Data Analysis, Functions and Algebra I.


Student Progress Report — Part 1

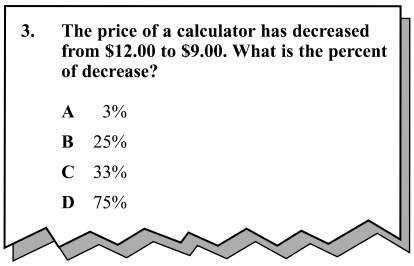
Record results from the pre- and post-test here to see strengths and weaknesses on test questions aligned to the SUMS.

Test Item: Pre-Test / Post-Test

Number Sense
- **1.1** Read, write and compare rational numbers in scientific notation with approximate numbers using scientific notation.
- **1.2** Add, subtract, multiply and divide rational numbers and take positive rational numbers to whole number powers.
- **1.3** Convert fractions to decimals and percents and use these representations in estimations, computations and applications.
- **1.6** Calculate the percentage of increase and decrease of a quantity.
- **1.7** Solve problems that involve discounts, markups, commissions and profit. Compute simple and compound interest.
- **2.1** Understand negative whole number exponents. Multiply and divide expressions involving exponents with a common base.
- **2.2** Add and subtract fractions, factoring to find common denominators.
- **2.4** Use the inverse relationship between raising to a power and extracting the root of a perfect square integer; for an integer that is not a square, determine without a calculator the two integers between which its square root lies and explain why.
- **2.5** Understand the meaning of absolute value of a number; interpret the absolute value as the distance of a number from zero on a number line and determine the absolute value of real numbers.

Mathematical Reasoning
- **1.2** Formulate and justify mathematical conjectures based on a general description.
- **2.1** Use estimation to verify the reasonableness of calculated results.
- **2.4** Make and test conjectures through inductive and deductive reasoning.
- **3.3** Develop generalizations of the results obtained and the strategies used to apply them.

Each question on the test matches a standard tested on the SUMS Exam.


3. The price of a calculator has decreased from $12.00 to $9.00. What is the percent of decrease?

A 3%
B 25%
C 33%
D 75%

Correlated to SUMS

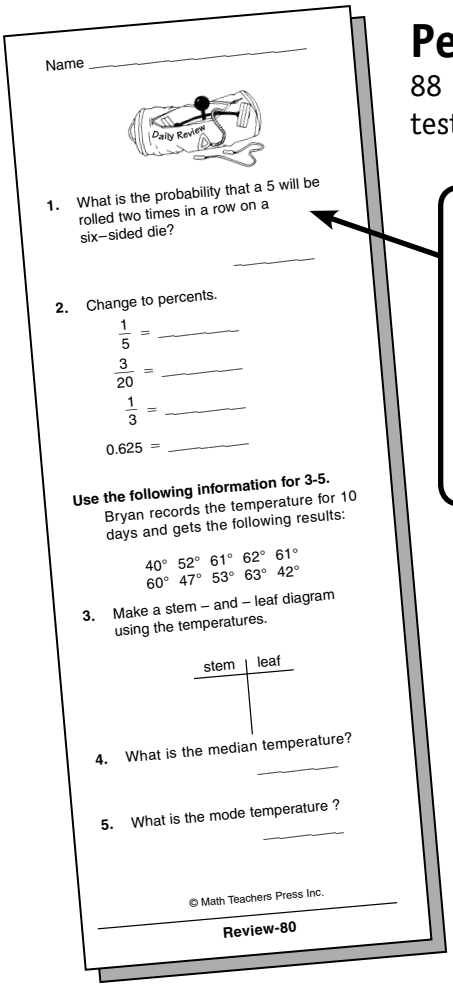
Each item on the test matches a SUMS item. Example shown covers Number Sense standard 1.6.

Record Sheets

Record sheets keep it all together. Results by topic and by objective allow teachers to focus on specific content areas.

Call toll-free (800) 852-2435 for answers to your questions.

Review & Reteaching


Name _____

Daily Review

1. What is the probability that a 5 will be rolled two times in a row on a six–sided die?

_____

2. Change to percents.

$\frac{1}{5}$ = _____

$\frac{3}{20}$ = _____

$\frac{1}{3}$ = _____

0.625 = _____

Use the following information for 3-5.
Bryan records the temperature for 10 days and gets the following results:

40° 52° 61° 62° 61°
60° 47° 53° 63° 42°

3. Make a stem – and – leaf diagram using the temperatures.

stem	leaf

4. What is the median temperature?

_____

5. What is the mode temperature ?

_____

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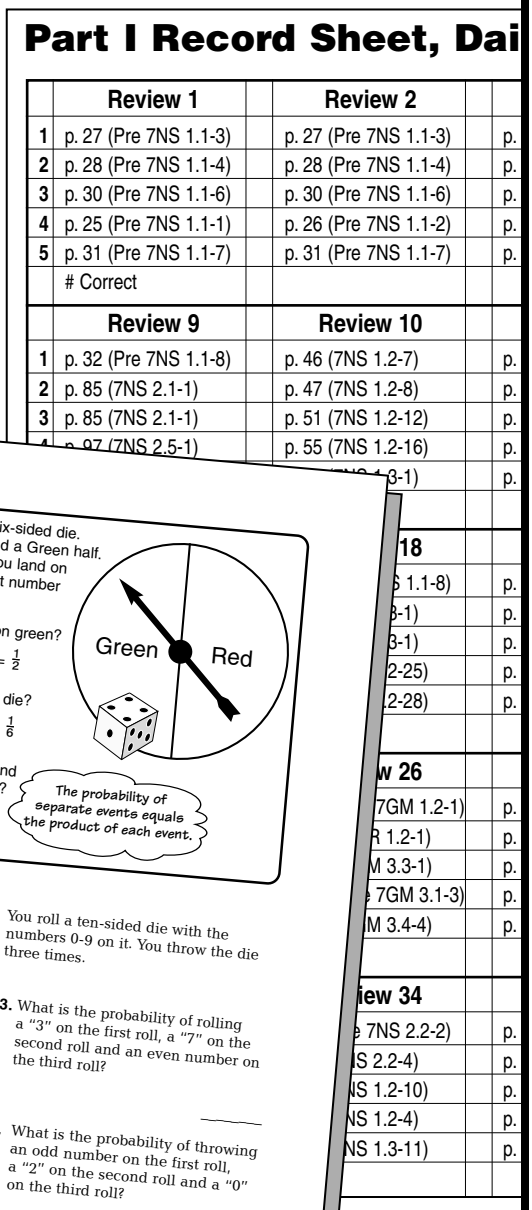
Review-80

Periodic Reviews

88 quick, five-question reviews cycle through all standards tested on the SUMS.

Every question on the review is matched to a content standard. Question 1 tests Statistics, Data Analysis, Probability, standard 3.5.
Results are recorded on the Daily Review Record Sheet (at right). *Skill Builders* pages are referenced for reteachin.


Part I Record Sheet, Dai

	Review 1		Review 2		
1	p. 27 (Pre 7NS 1.1-3)		p. 27 (Pre 7NS 1.1-3)		p.
2	p. 28 (Pre 7NS 1.1-4)		p. 28 (Pre 7NS 1.1-4)		p.
3	p. 30 (Pre 7NS 1.1-6)		p. 30 (Pre 7NS 1.1-6)		p.
4	p. 25 (Pre 7NS 1.1-1)		p. 26 (Pre 7NS 1.1-2)		p.
5	p. 31 (Pre 7NS 1.1-7)		p. 31 (Pre 7NS 1.1-7)		p.
	# Correct				

	Review 9		Review 10		
1	p. 32 (Pre 7NS 1.1-8)		p. 46 (7NS 1.2-7)		p.
2	p. 85 (7NS 2.1-1)		p. 47 (7NS 1.2-8)		p.
3	p. 85 (7NS 2.1-1)		p. 51 (7NS 1.2-12)		p.
4	p. 97 (7NS 2.5-1)		p. 55 (7NS 1.2-16)		p.
					p.

Modeling Independent Events

A game is played with a spinner and a six-sided die. The spinner is divided into a Red half and a Green half. If you land on Red, your turn is over. If you land on Green, you can roll the die and move that number of spaces on the game board.

What is the chance the spinner will land on green?

probability (G) = $\frac{\text{favorable outcomes}}{\text{possible outcomes}} = \frac{1}{2}$

What is the chance of rolling a "4" with the die?

probability (4) = $\frac{\text{favorable outcomes}}{\text{possible outcomes}} = \frac{1}{6}$

What are the chances of spinning "green" and then rolling a "4" when it is your turn to play?

$\frac{1}{2} \times \frac{1}{6}$ = _____

The probability of separate events equals the product of each event.

Model the problems to find the answers.

A spinner is divided into three equal sections colored red, blue and green. If the spinner lands on red, you lose your turn. If the spinner lands on blue or green, you can roll a six-sided die and move that number of spaces on the game board.

1. What is the probability of landing on blue or green and then rolling a "3" when it is your turn to play?

_____

2. What is the probability of landing on red and rolling a "6"?

_____

You roll a ten-sided die with the numbers 0-9 on it. You throw the die three times.

3. What is the probability of rolling a "3" on the first roll, a "7" on the second roll and an even number on the third roll?

_____

4. What is the probability of throwing an odd number on the first roll, a "2" on the second roll and a "0" on the third roll?

_____

Skill Builders
6 SDAP 3.5

Every reteaching page is matched to a content standard. This page covers probability and modeling independent events.

Reteaching and Homework

Teachers can assign extra reproducible *Skill Builders* pages for any tested content standard. (over 100 pages)

Visit www.movingwithmath.com for more assessment information.

"The relationship of percent, fractions and decimals is done so well that just about everyone finally understands it."

Pilot Teacher, Drop-Out Recovery Program

Objective: To write percents from fractions with denominators of 100 and decimals in hundredths.

Materials: Base ten blocks, Coins and Bills (Master 4), Centimeter Graph Paper (Master 2)

Introductory Activities

Fraction, Decimal, Percent Equivalencies

Discuss the meaning of various % scores on a math test, e.g. 73%, 100%, 50%, 20%. **A test score of 73% means that 73% of the test was answered correctly and 27% incorrectly. A score of 100% means that all questions were answered correctly,** etc.

Percents and Money, Fractions, Decimals

Display a $1 bill, penny, nickel, dime, quarter and half dollar. **The $1 bill will represent 1 unit or 1 whole in our system of money. The value of each coin can then be expressed as part of the whole dollar. How much is a penny worth?** (1 cent) **Can you write 1 cent as a decimal and as a fraction?** ($0.01 and $\frac{1}{100}$) **Each coin can be written as a fraction and decimal part of a dollar.**

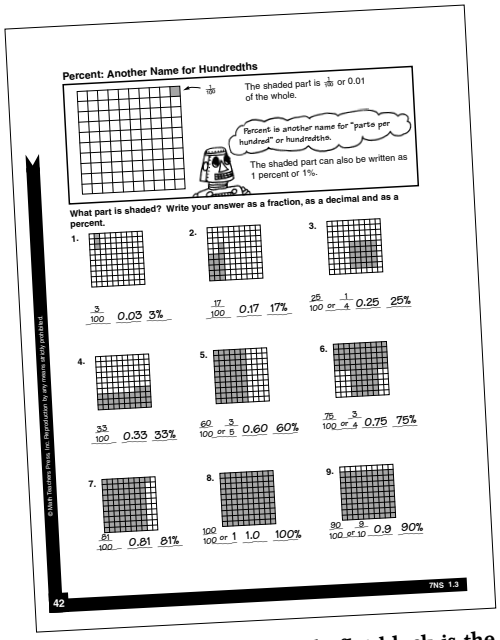
Write each set of equivalencies in a table on the board:

Money	Value	Decimal	Fraction	Percent
penny	1¢	$0.01	$\frac{1}{100}$	1%
nickel	5¢	$0.05	$\frac{5}{100}$	5%
dime	10¢	$0.10	$\frac{10}{100}$	10%
quarter	25¢	$0.25	$\frac{25}{100}$	25%
half dollar	50¢	$0.50	$\frac{50}{100}$	50%
$1 bill	100¢	$1.00	$\frac{100}{100}$	100%

Relating Percents to Models

Display 1 flat base ten block. **This flat block will represent 1 unit or 1 whole. How do we write 1 whole as a decimal, as a fraction and as a percent?** (1.0 or 1.00; $\frac{10}{10}$ or 1/1 or $\frac{100}{100}$; 100%)

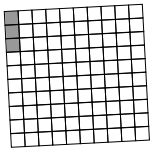
Display 1 long block and 1 unit block. **The value of each of these smaller blocks can be expressed as a part of the 1 whole or 1 unit. What fraction of the flat block is the long block?** (1 tenth) **How do we write one tenth as a decimal, as a fraction and as a percent?** (0.1, $\frac{1}{10}$, 10%)



What fraction of the whole flat block is the unit block? (one hundredth) **How do we write one hundredth as a decimal, as a fraction and as a percent?** (0.01, $\frac{1}{100}$, 1%)

About This Page

Display a flat block or a decimeter square (made from Master 2) on the overhead. Cover parts of the flat with unit blocks or long blocks or shade small squares inside the decimeter square.



What part of the whole is shaded? (3 units) **How do we write the shaded part in words, as a decimal, as a fraction and as a percent?** (3 hundredths, 0.03, $\frac{3}{100}$, 3%)

Follow Up Activities

Skill Builders 7NS 1.3-5 to 1.3-6

42

"Students were more confident taking the (state) exit exam because this program gave them appropriate models to follow. Using manipulatives helps them develop visual pictures for later use."

Tom Downer, Pilot Teacher

Objective: To use a variety of problem solving strategies to solve a word problem.

Materials: Problem Solving Steps and Strategies (Master 10), posterboard (optional)

Introductory Activities

Strategies for Solving Problems

Write on the board:

There are 10 chapters in a book and 25 pages in each chapter. Joyce has read over 100 pages. How many pages are in the book?

Refer to Master 10 as you solve the problem on the board.

1. Have a student volunteer read the problem aloud and then retell the story.
2. Have a student volunteer underline the question and circle the needed facts. Ask how the question is related to each of the facts, so the student can see that this problem has an unnecessary fact.
3. In this activity, students will see that a variety of strategies may be used to solve a problem. List each strategy on a classroom chart titled *Problem Solving Strategies,* if desired. Ask whether each of the following five strategies might be used to solve the problem.

   Act it out – Yes, students could look at an actual book with a given number of chapters and a given number of pages to act out the problem.

   Use a model – Yes, students could build 10 groups of 25 with base ten blocks, put like blocks together and record the answer.

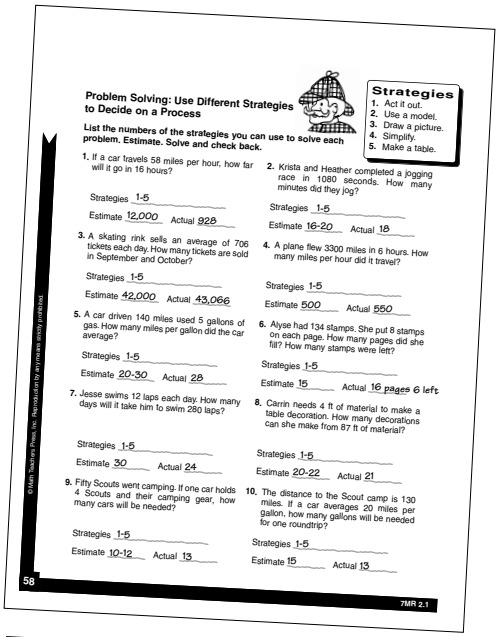
   Draw a picture – Yes, students could draw a sketch of 10 chapters with 25 pages in each to visualize the problem involves putting together groups of equal size.

   Simplify – Yes, the numbers could be changed to 10 and 20.

   Make a table – Yes, the table would be:

1 chapter	25 pages
2 chapters	50 pages
10 chapters	250 pages

4. Estimate.
5. Solve and check back.



Problem Solving: Use Different Strategies to Decide on a Process

List the numbers of the strategies you can use to solve each problem. Estimate. Solve and check back.

Strategies
1. Act it out.
2. Use a model.
3. Draw a picture.
4. Simplify.
5. Make a table.

1. If a car travels 58 miles per hour, how far will it go in 16 hours?
   Strategies 1-5
   Estimate 12,000 Actual 928
2. Krista and Heather completed a jogging race in 1080 seconds. How many minutes did they jog?
   Strategies 1-5
   Estimate 16-20 Actual 18
3. A skating rink sells an average of 706 tickets each day. How many tickets are sold in September and October?
   Strategies 1-5
   Estimate 42,000 Actual 43,066
4. A plane flew 3300 miles in 6 hours. How many miles per hour did it travel?
   Strategies 1-5
   Estimate 500 Actual 550
5. A car driven 140 miles used 5 gallons of gas. How many miles per gallon did the car average?
   Strategies 1-5
   Estimate 20-30 Actual 28
6. Alyse had 134 stamps. She put 8 stamps on each page. How many pages did she fill? How many stamps were left?
   Strategies 1-5
   Estimate 15 Actual 16 pages 6 left
7. Jesse swims 12 laps each day. How many days will it take him to swim 280 laps?
   Strategies 1-5
   Estimate 30 Actual 24
8. Carrin needs 4 ft of material to make a table decoration. How many decorations can she make from 87 ft of material?
   Strategies 1-5
   Estimate 20-22 Actual 21
9. Fifty Scouts went camping. If one car holds 4 Scouts and their camping gear, how many cars will be needed?
   Strategies 1-5
   Estimate 10-12 Actual 13
10. The distance to the Scout camp is 130 miles. If a car averages 20 miles per gallon, how many gallons will be needed for one roundtrip?
    Strategies 1-5
    Estimate 15 Actual 13

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About This Page

Read the instructions, the list of strategies and the first problem together.

Can we use strategy #1 – Act it out – to solve this problem? (Yes, we can pretend to drive 58 miles for each of 16 hours.)

Can we use strategy #2 – Use a model? (Yes, we could build 16 groups of 58.)

Can we use strategy #3 – Draw a picture? (Yes, we can draw a line showing 16 spaces, with 58 miles written inside each space, as 16 groups of 58 miles each.)

Can we use strategy #4 – Simplify? (Yes, we could use simpler numbers in the problem to understand the operation needed: 6 miles and 2 hours.)

Can we use strategy #5 – Make a table? (Yes. 1 hour – 58 miles; 2 hours – 116 miles…)

Although we can use all five strategies, which would you probably prefer to use for this problem? Why? (Allow students the chance to explain their favorite strategy.)

Follow Up Activities

Skill Builders 7MR 2.1-1

58

*"My students are **finally** experiencing success with math where they could not before. A great design to use with groups of different ability levels."*

Pilot Teacher

Objective: To introduce and create scatter plots.

Materials: Index cards, measuring tape, Centimeter Graph Paper (Master 2)

Vocabulary: scatter plot, positive correlation, negative correlation

Introductory Activities

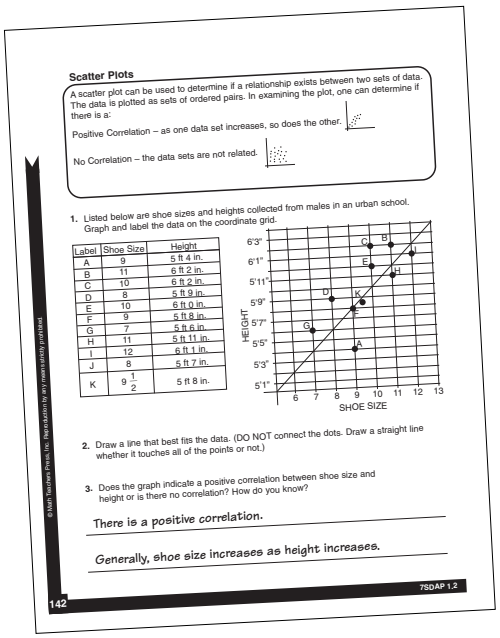
Making a Scatter Plot

In this activity students use index cards to collect data to compare their heights and shoe sizes. After using this information to form a scatter plot, they discuss the meaning of a positive correlation.

Have students write their names, height and shoe size on an index card. If students are not sure how tall they are, have a measuring tape secured to a doorway for a quick measurement. Collect the cards.

How should we organize this information? (Separate the cards between males and females because shoes are sized differently for them.) After the cards are sorted, tape the index cards for the females to the board or write the data where the students can easily see it. **If we make a scatter plot, which data set should we put along the *x*-axis?** (Either will work, but it may be easier to use shoe size because there is usually a smaller range.) Ask students about the smallest and largest shoe sizes and record their responses. **What number should we start with along the bottom? In what increments should we move up?** (by whole or halves) Write the starting number and continue across the *x*-axis. **What are the shortest and tallest heights? What height should we start with? By how many inches should we move up along the side per space?** Write the starting number and continue up at equal intervals to the highest number on the *y*-axis.

After all of the females' points have been plotted, have the class look at how the points are distributed. **If we were to draw a line to model the trend that exists among these data points, how would we draw this line?** (up and to the right) **In general, although the line is not perfectly straight, what is happening as shoe size increases?** (as shoe size increases, height tends to increase) **When one data set increases as the other increases, it is called a positive correlation. A scatter plot of data with a positive correlation will be in a pattern that tends to go up and to the right.**



Scatter Plots

A scatter plot can be used to determine if a relationship exists between two sets of data. The data is plotted as sets of ordered pairs. In examining the plot, one can determine if there is a:

Positive Correlation – as one data set increases, so does the other.

No Correlation – the data sets are not related.

1. Listed below are shoe sizes and heights collected from males in an urban school. Graph and label the data on the coordinate grid.

Label	Shoe Size	Height
A	9	5 ft 4 in.
B	11	6 ft 2 in.
C	10	6 ft 2 in.
D	8	5 ft 9 in.
E	10	6 ft 0 in.
F	9	5 ft 8 in.
G	7	5 ft 6 in.
H	11	5 ft 11 in.
I	12	6 ft 1 in.
J	8	5 ft 7 in.
K	9 1/2	5 ft 8 in.

HEIGHT: 6'3", 6'1", 5'11", 5'9", 5'7", 5'5", 5'3", 5'1"

SHOE SIZE: 6 7 8 9 10 11 12 13

2. Draw a line that best fits the data. (DO NOT connect the dots. Draw a straight line whether it touches all of the points or not.)

3. Does the graph indicate a positive correlation between shoe size and height or is there no correlation? How do you know?

There is a positive correlation.

Generally, shoe size increases as height increases.

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About This Page

Read the information at the top of the page. Assist students to plot several points. Continue until all data is plotted, then discuss the correlations.

Follow Up Activities

Scatter Plots of Real Data

Use *Skill Builders* 7SDAP 1.2-1 to have students make a scatter plot of the male data collected in class.

Negative Correlation

Provide data with a negative correlation. An example is shown below. Have students plot at least 10 points and discuss the meaning of a negative correlation: when one data set increases (in this case the hours of work missed) the other data set decreases (the amount of money made).

Hours Missed	Wages Earned
0.0	$200
7.5	$10
6.0	$50
0.5	$210
1.5	$150
3.0	$100
7.0	$70
6.5	$40
0.5	$165
7.0	$50

142

*"Students love the program because they feel they **finally** know what the other kids know. It takes the fear away from something they think will be too difficult. It demystifies math!"*

Pilot Teacher

Objective: To solve systems of linear equations by graphing.

Materials: Coordinate Grids (Master 5), transparency of Overhead Coordinate Grid (Master 14)

Vocabulary: systems of linear equations, point of intersection

Introductory Activities

Systems of Linear Equations

Write on the board:

I am thinking of two numbers whose sum is 12.
Two times one number plus the other is 20.
Draw a graph to find the missing numbers.

When a problem involves more than one unknown number, it may often be more easily solved by representing each of the unknown numbers by a different letter such as *x* and *y*. If a problem has two unknowns, it may be solved by using two variables in two equations to create a system of equations.

How many unknowns in this problem? (2) **How should we start our problem?** (by identifying the question and writing *x* related to what we are looking for)

Let x = unknown number
y = other unknown number

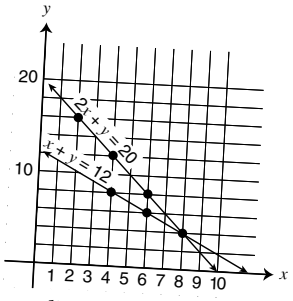
Write two equations about *x* and *y*.

$x + y = 12$
$2x + y = 20$

Complete tables for each equation and graph the lines.

x	y
8	4
6	6
4	8

x	y
2	16
4	12
6	8

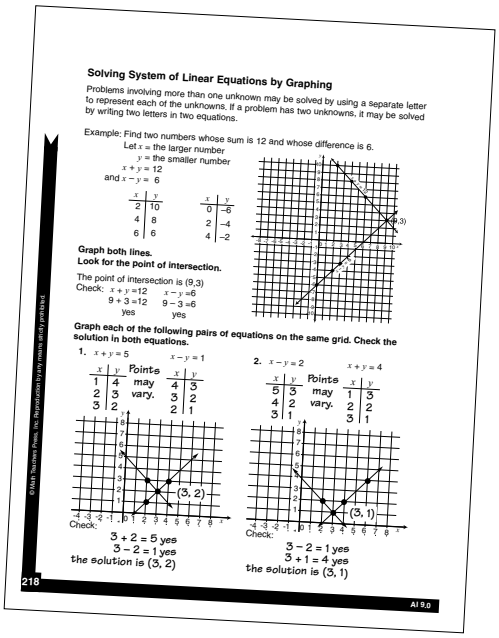


The coordinates of the point of intersection represent the common solution of the two equations. What is the point of intersection? (8, 4)

Check by substituting 8 for *x* and 4 for *y*:

$x + y = 12$
$8 + 4 = 12$
$12 = 12$
Yes

$2x + y = 20$
$(2 \cdot 8) + 4 = 20$
$16 + 4 = 20$
$20 = 20$
Yes



About This Page

Read the example at the top of the page. Be sure students understand that 3 points are plotted from each equation and how to read the point of intersection from the graph.

Follow Up Activities

A History Connection

The French mathematician Descartes discovered the graphical method of solving sets of equations in 1637. Descartes was the first to plot negative numbers in a system of linear equations.

Skill Builders Al 9.0-1

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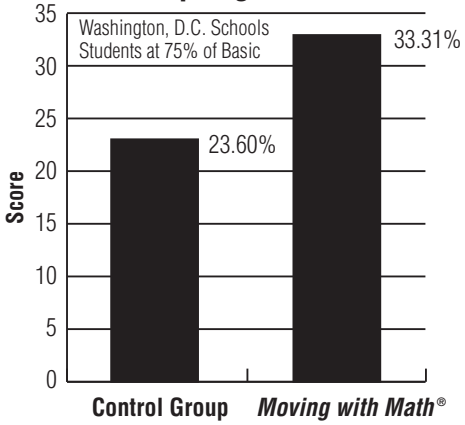

*Source: George Washington University Center for Equity and Excellence in Education.

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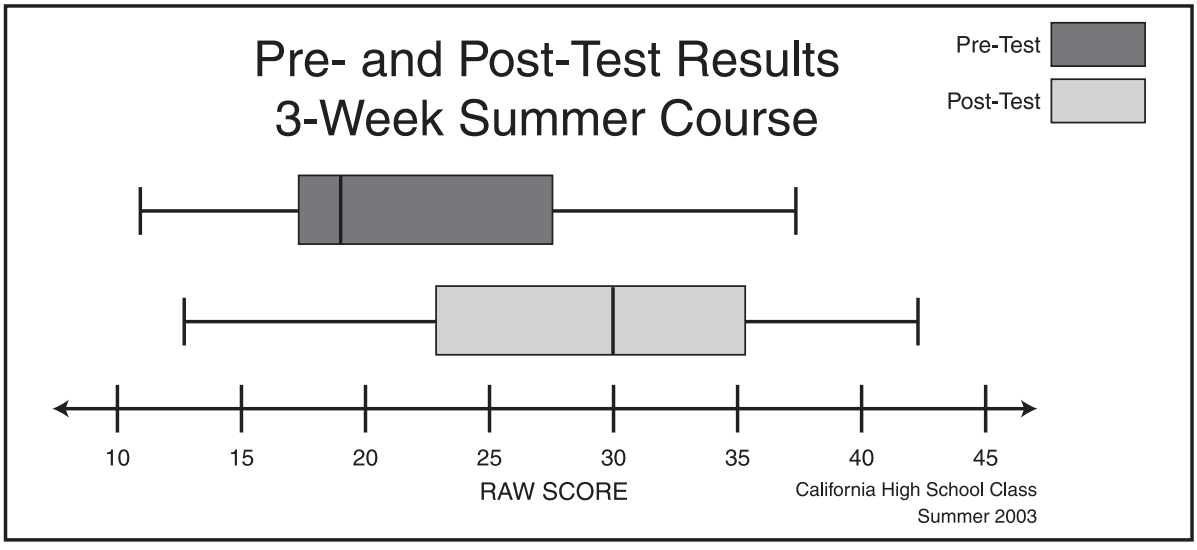

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