Table of Contents

Florida asp academic support program

Part 1: Teacher's Guide

Introduction TG1
Pacing Guide TG5
Graphic Organizers TG11
Standards Correlations TG31
Pre-/Post-Assessment TG37
Openers TG49

Part 2: Number Sense, Concepts, and Operations

Number Theory 1
Exponents and Square Roots 12
Order of Operations 22
Scientific Notation 26
Comparing and Ordering Numbers 29
Rational and Irrational Numbers 40
Adding and Subtracting with Fractions 47
Multiplying and Dividing with Fractions 69
Problem Solving with Fractions 78
Part 2 Answer Key 83

Part 3: Geometry and Spatial Sense; Measurement

Triangles 87
Right Triangles and the Pythagorean Theorem 97
The Parts of a Circle 108
Finding Circumference Measurements 111
Area of a Circle 115
Finding Volume and Surface Area 118
Volume of a Cylinder 127
Transformations and Similarity 131
Two-Dimensional and Three-Dimensional Figures 140
Part 3 Answer Key 148

Part 4: Algebraic Thinking

Algebraic Expressions and Equations 151
Simplifying and Evaluating Expressions 164
Solving Equations 168
Graphing Relationships 175
Ratios and Proportional Relationships 181
Part 4 Answer Key 197

Part 5: Data Analysis and Probability

Formulating Questions and Collecting Data 199
Frequency Distributions and Tables 204

Table of Contents

Graphs, Tables, and Other Displays of Data 212
Analyzing Data Using Measures of Central Tendency 225
Experimental and Theoretical Probability 232
Part 5 Answer Key 244

Part 6: Hands-On Activities

Introduction 247
Number Sense, Concepts, and Operations 251
Set 1 251
Set 2 258
Set 3 265
Set 4 272
Set 5 279
Geometry and Spatial Sense; Measurement 287
Set 1 287
Set 2 294
Set 3 304
Set 4 314
Set 5 322
Algebraic Thinking 331
Set 1 331
Set 2 338
Set 3 347
Set 4 355
Set 5 362
Data Analysis and Probability 371
Set 1 371
Set 2 379
Set 3 388
Set 4 395
Set 5 403

Part 7: Test-Taking Preparation

Test-Taking Strategies 411
Know the Test 412
Number Sense, Concepts, and Operations 415
Geometry and Spatial Sense; Measurement 421
Algebraic Thinking 427
Data Analysis and Probability 433
Part 7 Answer Key 438

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Introduction

The *Florida Academic Support Program (ASP) for Mathematics* is a complete, turnkey solution for improving educational performance. Topics are built around accessible core curriculum, ensuring that the *ASP* is useful for striving students and diverse classrooms.

This program recognizes that many struggling students aren't reached by traditional "skill-and-drill," or strict test-prep approaches.

The *ASP* includes components that review, instruct as needed, provide practice, and assess students' skills. Instructional tools and strategies are embedded throughout. The scope and sequence addresses the needs of students who require additional support in topics included in Florida's Sunshine State Standards and the National Council of Teachers of Mathematics Standards.

This 3-ring binder includes the following:

- Over 20 days worth of lessons with reproducible activity sheets keyed to standards
- A section on test-taking strategies and a collection of practice items
- A collection of station-based activities for small group work
- A problem-based mathematics teacher's guide that:
  - describes the purpose of the materials and options for using the program
  - provides pacing guide options
  - recommends an assortment of graphic organizers for instructional strategies
  - includes an assortment of openers—to begin a class or to make a transition
  - references relevant state standards

Purpose of Materials

The *Florida Academic Support Program for Mathematics* is a flexible program that has been organized to fit your students' needs in summer school.

Each day's schedule begins with direct instruction and guided practice and moves on to opportunities for developing and applying new skills and concepts in problem-solving situations.

The 20-day program includes all of the major content strands in the Sunshine State Standards. These include the following:

- Number Sense, Concepts, and Operations
- Geometry and Spatial Sense; Measurement
- Algebraic Thinking
- Data Analysis and Probability

Problem solving, reasoning and proof, communication, connections, and representation are infused throughout.

Structure of the Binder

The *ASP* is provided, for your convenience, in a binder format. The materials are completely reproducible, allowing you to make as few or as many copies as you need. If students lose an activity sheet, it's easy to make a new one. Tabs allow you to access the different sections of the binder quickly and easily.

The Teacher's Guide is the first section. This section allows you to navigate the materials with the pacing guide. The Teacher's Guide offers fifteen graphic organizers and suggested strategies for their use, includes a collection of "openers" to start class, and shows how the lessons correlate to the Sunshine State Standards and Grade Level Expectations.

The next four sections focus on content and knowledge of Number Sense, Concepts, and Operations; Geometry and Spatial Sense, Measurement; Algebraic Thinking; and Data Analysis and Probability. The units in the *ASP* can be implemented as prescribed in the pacing guide, yet the design is flexible so that you can mix and match sections and units as the needs of your students and your instructional style dictate.

Part 6 contains a collection of hands-on activities designed for cooperative learning at a series of classroom stations. These correspond to the four content strands, and give students the opportunity to apply concepts and skills while you have a chance to circulate, observe, speak to individuals and small groups, and informally assess and plan.

The final section focuses on test taking. This section allows you to demystify tests, such as the FCAT, for your students. There are five practice assessments for each section of instruction. You may choose to administer some of the assessments as you move through the instructional sequence, or utilize them only at the end. Used on their own or in combination with the content-area units, students will gain confidence in their abilities through familiarity of question types within the context of the content they have reviewed.

Structure of Units

Nearly all the instructional units in Parts 2, 3, 4, and 5 have some common features.

In each class session, you will present a topic. Some topics may be a review for students; other topics may be completely new to them. After some instruction, you will provide students with practice activities to try. Students will have a chance to talk about how they completed their work. There are additional materials to use if you are confident that students are ready to extend their learning. If students need more practice or further explanation, you can provide them with that, too!

1. The Goal Statement

Each unit begins with a brief objective of what students should know, understand, or be able do at the end of the unit.

2. Words to Know

Vocabulary terms are provided as background information for instruction, or to review key concepts that are addressed in the unit.

3. Background

An explanation of the mathematics and/or instructional model is included for your information. This may include details about the history of math or about applying math skills in the real world.

4. Direct Instruction

This section is a guide for a teacher-led activity to review and/or instruct students on a specific skill or topic (activities are 15 to 45 minutes in length). Instructional strategies include lecture, modeling, discussion, group facilitation, and more. The activities often include the use of one or more of the graphic organizers found in the Teacher's Guide. This section frequently refers to presenting information on the board or via an overhead projector, and includes diagrams and sample problems to be presented to the class in this manner.

5. Student Activity Pages

Each unit includes three or more lesson tasks and activities to support students' achievement of learning objectives. These sheets are written for the student. They can be used in any combination of teacher-led instruction, cooperative learning, or independent application of knowledge.

Overview

The pacing guide on the following pages serves as a guide for planning and pacing your summer school sessions. The recommendations regarding time frames and activity selections are intended to help you make decisions about your summer school sessions—not as a hard-and-fast schedule.

The pacing guide recommends an opening activity, direct instruction and guided practice exercises, an assessment "problem of the day," and a series of hands-on stations for each day of summer school. These suggestions conform to the model schedule below.

You will need to use your professional judgment to gauge appropriate time frames, sequences, and emphases for your students. The *ASP* includes more than 20 days' worth of materials. The pacing guide should help you to work through the program, but your own perceptions and thinking will serve as the final authority.

Model Schedule

- Four weeks of summer school
- One content strand per week:
    1. Number Sense, Concepts, and Operations
    2. Geometry and Spatial Sense; Measurement
    3. Algebraic Thinking
    4. Data Analysis and Probability
- One instructional topic/focus per day (see table of contents and pacing guide)

ASP Sample Summer School Day (4.5 hours)	
8:00–8:20	Opener/engagement activity and debrief
8:20–9:00	Direct instruction—introduction to concepts/procedures
9:00–9:45	Guided practice—class activities and/or worksheets
9:45–10:00	Summarize/synthesize
10:00–10:30	Practice assessment item and discussion
Lunch	
11:00–12:15	Stations for practice/application (small groups circulate)
12:15–12:45	Class discussion to synthesize learning from stations
12:45–1:00	Reflection and wrap-up

Day 1	Day 2	Day 3	Day 4	Day 5
Instructional Topic Number Theory **Opener** Places, Everyone!, p. TG50 **Direct Instruction** Pre-Assessment, pp. TG37–TG48 Factoring, Multiples, Prime and Composite Numbers, Divisibility, pp. 1–3 Factor Trees, pp. 7–9 Exponents and Square Roots, pp. 12–17 Order of Operations, pp. 22–24 **Practice** Diagramming Divisibility, pp. 4–6 Factor Trees, pp. 10–11 Writing Exponents, p. 18 Exponents and Variables, pp. 19–21 **Test Prep** Number Sense, Concepts, and Operations MA.A.1.3.2. Item 1 p. 415 **Hands-On Activities** Number Sense, Concepts, and Operations: Set 1, pp. 251–257	**Instructional Topic** Comparing and Ordering Numbers **Opener** In Your Place, p. TG51 **Direct Instruction** Order of Operations, pp. 22–24 Scientific Notation, pp. 26–27 Comparing and Ordering Numbers, pp. 29–37 Rational and Irrational Numbers, pp. 40–42 **Practice** Order of Operations, p. 25 Scientific Notation, p. 28 Comparing and Ordering Numbers pp. 38–39 Rational and Irrational Numbers, pp. 43–46 **Test Prep** Number Sense, Concepts, and Operations MA.A.2.3.1 Item 2 p. 416 **Hands-On Activities** Number Sense, Concepts, and Operations: Set 2, pp. 258–264	**Instructional Topic** Adding and Subtracting Numbers **Opener** Squares Are Cool!, p. TG52 **Direct Instruction** Fraction Concepts, pp. 47–50 Reducing to Lowest Terms, p. 52 Improper Fractions and Mixed Numbers, pp. 54–55 Adding with Like Denominators, pp. 57–58 Adding with Unlike Denominators, p. 60 Subtracting with Like Denominators, p. 62 Subtracting with Unlike Denominators, p. 64 Borrowing in Subtraction, pp. 66–67 **Practice** Fraction Concepts, p. 51 Reducing to Lowest Terms, p. 53 Improper Fractions and Mixed Numbers, p. 56 Adding with Like Denominators, p. 59 Adding with Unlike Denominators, p. 61 Subtracting with Like Denominators, p. 62 Subtracting with Unlike Denominators, p. 65 Borrowing in Subtraction, p. 68 **Test Prep** Number Sense, Concepts, and Operations MA.A.1.3.2 Item 3 p. 417 **Hands-On Activities** Number Sense, Concepts, and Operations: Set 3, pp. 265–271	**Instructional Topic** Multiplying and Dividing with Fractions **Opener** The Numbers Are Prime, p. TG53 **Direct Instruction** Multiplying Fractions, pp. 69–70 Canceling with Multiplication, pp. 72–73 Dividing Fractions, pp. 75–76 **Practice** Multiplying Fractions, p. 71 Canceling with Multiplication, p. 74 Dividing Fractions, p. 77 **Test Prep** Number Sense, Concepts, and Operations MA.A.3.3.1 Item 4 p. 418 **Hands-On Activities** Number Sense, Concepts, and Operations: Set 4, pp. 272–278	**Instructional Topic** Problem Solving with Fractions **Opener** Palindromic Numbers, p. TG54 **Direct Instruction** Review as necessary **Practice** Application: Word Problems with Fractions, pp. 79–80 Application: Fractions in Your Day, pp. 81–82 **Hands-On Activities** Number Sense, Concepts, and Operations: Set 5, pp. 279–286 **Test Prep** Number and Operations MA.A.4.3.1 Item 5 p. 419

Stem-and-Leaf Plot

Stem	Leaf
____	_____
____	_____
____	_____
____	_____
____	_____
____	_____
____	_____

Leaf	Stem	Leaf
_____	____	_____
_____	____	_____
_____	____	_____
_____	____	_____
_____	____	_____
_____	____	_____
_____	____	_____

Standards Correlations

NUMBER SENSE, CONCEPTS, AND OPERATIONS

Standard 1

The student understands the different ways numbers are represented and used in the real world.

Benchmark MA.A.1.3.1: The student associates verbal names, written word names, and standard numerals with integers, fractions, decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratios.

Benchmark MA.A.1.3.3: The student understands concrete and symbolic representations of rational numbers and irrational numbers in real-world situations.

Benchmark MA.A.1.3.4: The student understands that numbers can be represented in a variety of equivalent forms, including integers, fractions, decimals, percents, scientific notation, exponents, radicals, and absolute value.

Standard 2

The student understands number systems.

Benchmark MA.A.2.3.1: The student understands and uses exponential and scientific notation.

Standard 3

The student understands the effects of operations on numbers and the relationships among these operations, selects appropriate operations, and computes for problem solving.

Benchmark MA.A.3.3.1: The student understands and explains the effects of addition, subtraction, multiplication, and division on whole numbers, fractions, including mixed numbers, and decimals, including the inverse relationships of positive and negative numbers.

Benchmark MA.A.3.3.2: The student selects the appropriate operation to solve problems involving addition, subtraction, multiplication, and division of rational numbers, ratios, proportions, and percents, including the appropriate application of the algebraic order of operations.

Benchmark MA.A.3.3.3: The student adds, subtracts, multiplies, and divides whole numbers, decimals, and fractions, including mixed numbers, to solve real-world problems, using appropriate methods of computing, such as mental mathematics, paper and pencil, and calculator.

4. Mr. Ramirez gave his math class a quiz with ten problems. The following table shows how many students answered correctly or incorrectly for each.

Problem #	# of students who answered correctly	# of students who answered incorrectly
1	23	1
2	21	3
3	19	4
4	22	2
5	19	5
6	18	6
7	21	3
8	22	2
9	15	9
10	23	1

What percent of students answered problem 6 incorrectly?

a. 25%

b. 30%

c. 33%

d. 40%

5. A particular car weighs 1,650 kg. How would you express its mass using scientific notation?

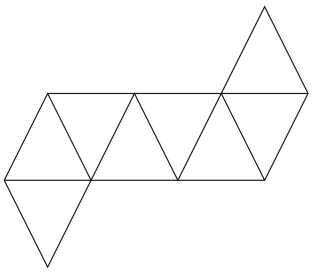
a. $1.650 \bullet 10^4$ kg

b. $1.650 \bullet 10^3$ kg

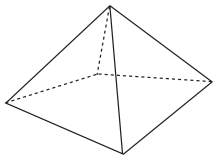
c. $16.50 \bullet 10^2$ kg

d. $165.0 \bullet 10^1$ kg

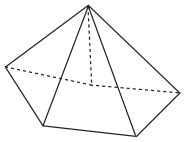
8. Which solid can be formed with the net below?



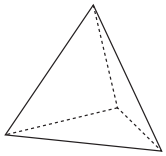
a.



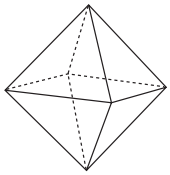
b.



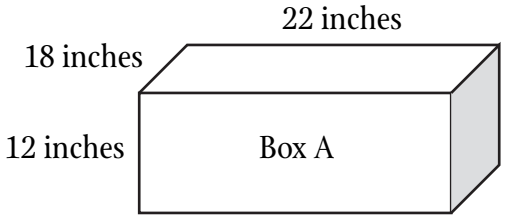
c.

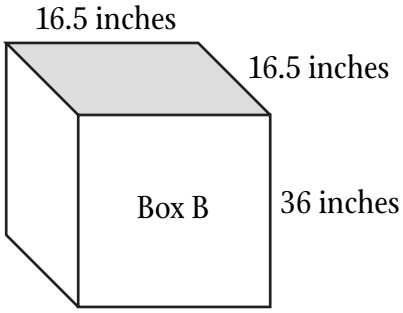


d.



9. Leila is packing up toys she no longer needs and wants to give to a local homeless shelter. She has two packing boxes.





Which of the following is true?

a. The volume of Box A is 2.5 ft^3.

b. Box A can hold $\frac{1}{3}$ as much as Box B.

c. Box B can hold more than twice as much as Box A.

d. Box A can fit completely inside Box B.

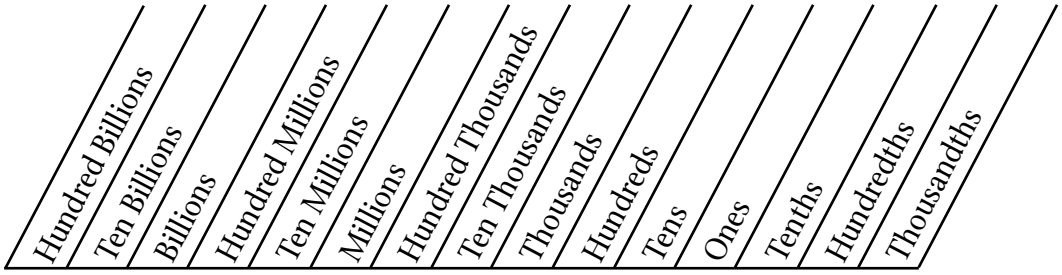
Openers

Use these activities to start class, make a transition, or fill a lull between lessons. Each activity takes 5–15 minutes and addresses mathematics from the SSS. Used at the beginning of class, they help students focus, provide a little review and reinforcement, and allow you to do some informal assessment. By observing students at work and discussing their strategies and solutions, you can gauge student's prior knowledge and plan accordingly.

	Title	Content Strand
1	Places, Everyone!	Number Sense, Concepts, and Operations
2	In Your Place	Number Sense, Concepts, and Operations
3	Squares Are Cool!	Number Sense, Concepts, and Operations
4	The Numbers Are Prime	Number Sense, Concepts, and Operations
5	Palindromic Numbers	Number Sense, Concepts, and Operations
6	State Your Knowledge	Number Sense, Concepts, and Operations
7	Time to Play Catch-Up	Geometry and Spatial Sense; Measurement
8	What's Your Angle?	Geometry and Spatial Sense; Measurement
9	Perfect Perimeters	Geometry and Spatial Sense; Measurement
10	Hiking a National Park	Geometry and Spatial Sense; Measurement
11	All on the Surface	Geometry and Spatial Sense; Measurement
12	Go Figure!	Geometry and Spatial Sense; Measurement
13	Fishing for a Pattern	Algebraic Thinking
14	XYZ	Algebraic Thinking
15	Home-Run Fun	Algebraic Thinking
16	State My Rule	Algebraic Thinking
17	Width and Length Relationship	Algebraic Thinking
18	What's the Pattern?	Algebraic Thinking
19	Snack Time	Data Analysis and Probability
20	Lisa's Lunch Box	Data Analysis and Probability
21	It's Magic!	Data Analysis and Probability
22	In the Median	Data Analysis and Probability
23	What Are the Odds?	Data Analysis and Probability
24	Roll 'Em	Data Analysis and Probability

Places, Everyone!

Each digit in a number has a certain value depending on where it is in the number. This is called **place value.** You use place value to read numbers. In the three-digit number 149, for example, 1 is in the hundreds place, 4 is in the tens place, and 9 is in the ones place. There are 1 hundred, 4 tens, and 9 ones in the number.



The following numbers are written in word form. Write them as numbers on the line.

Example: One hundred ten = 110

1. Seventy-two million, three hundred fifty-two thousand, eight hundred and three _____
2. Ninety-eight and three hundredths _____
3. Five and three hundred eight thousandths _____
4. Two hundred eighteen thousand, nine hundred ninety-nine _____
5. Seven hundred eleven and six tenths _____
6. Forty-three million, seven hundred and two _____

Write the place value of each underlined digit on the line.

Example: 10<u>5</u> ones

7. 3<u>5</u>8,478,641 _____
8. 677.1<u>6</u> _____
9. 539.32<u>7</u> _____
10. <u>4</u>3,422.812 _____
11. 410,987.2<u>5</u> _____
12. 243,596.<u>3</u> _____
13. <u>7</u>25,978.03 _____
14. <u>1</u>,234,567,890 _____

Challenge: Now it's your turn! On a separate sheet of paper, create four large numbers and identify each place value.

Number Theory

Florida asp academic support program

Instruction

Goal: To understand and develop strategies for identifying factors and multiples

WORDS TO KNOW

composite number	a natural number that is not prime
factor	one of two or more expressions that are multiplied together to get a product
multiple	a multiple of a number is the product of that number and any other whole number; zero is a multiple of every number
prime number	a number whose only factors are itself and 1
prime factors	the prime numbers that divide into an integer exactly, without leaving a remainder
greatest common factor	the largest number that divides two or more numbers evenly
least common multiple	the smallest nonzero number that is a multiple of two or more numbers

Direct Instruction

Explain to students that concepts of factoring, finding multiples, and knowing whether numbers are prime or composite, are all tools that they'll need for working with fractions, doing algebra, and solving other kinds of problems.

Using tiles or a grid template on an overhead projector, show students the idea of prime and composite numbers and factors and multiples by demonstrating the ways that numbers can be displayed in graphic form.

For example, three tiles or squares have to be displayed in a single row while four tiles or squares might be in one row of four or two rows of two.

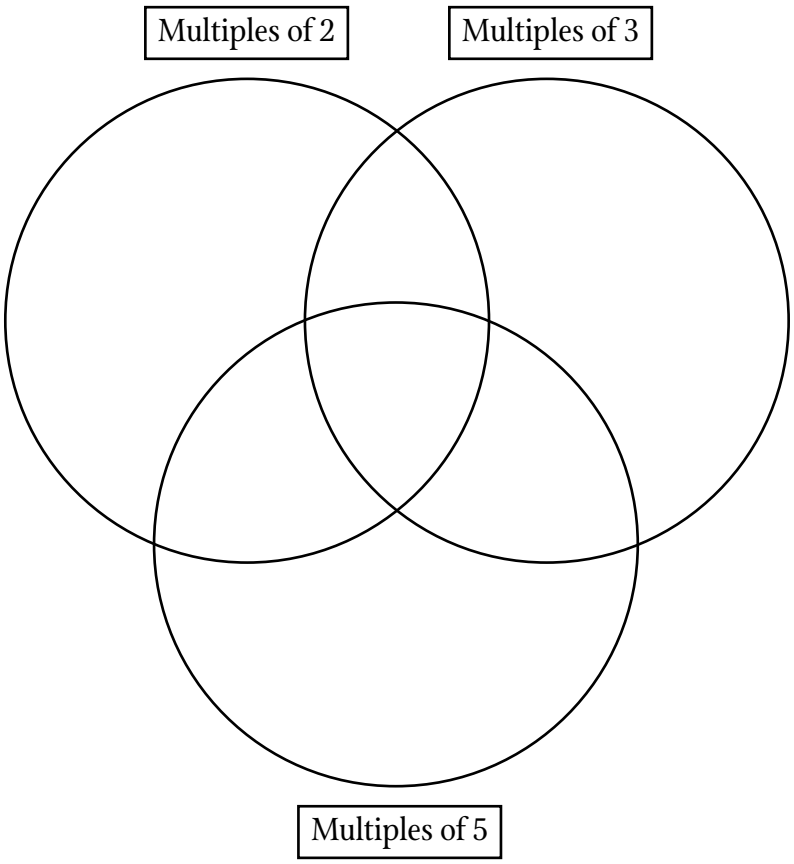
Class Activity

Materials: tiles or grid paper for students

1. Take six tiles and ask students to arrange them into possible areas. There are only two possible configurations. Both cases show the area is six square units—six tiles arranged in a row (6×1 rectangle) and three tiles arranged in two rows (3×2 rectangle). In this case, we could say numbers 1, 2, 3, and 6 are factors of 6 (6 is divisible by 1, 2, 3, and 6).

Class Activity 1: Diagramming Divisibility

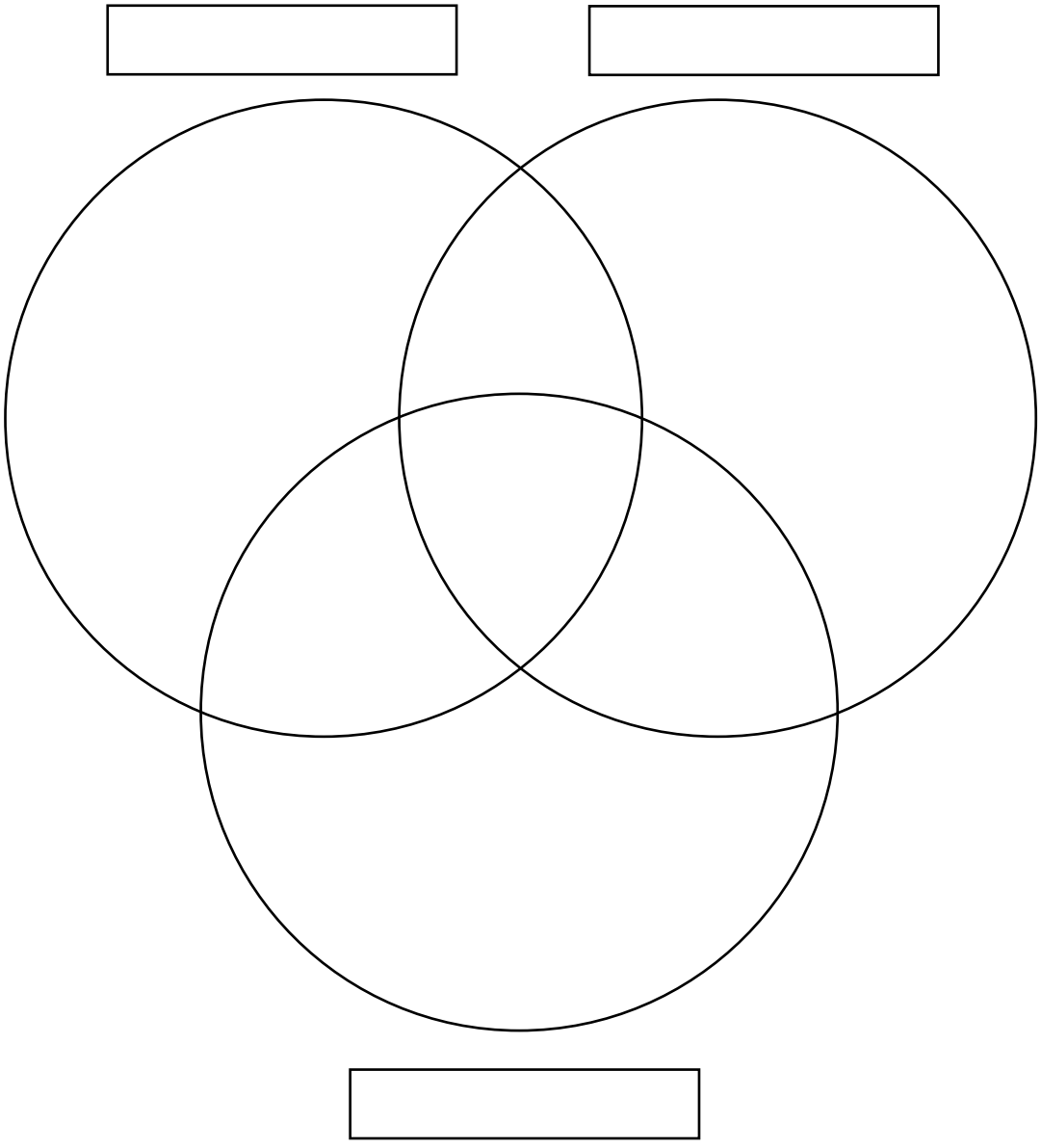
Place the numbers that are at the bottom of the page in the correct circle. If the number has something in common with two circles, place it in the space that is common to both; if it has something in common with all three circles, place it in the space that indicates this. If the number has nothing in common with any of the factors, place it outside the circles.



4	6	8	10	12
13	14	15	18	22
23	24	25	28	30
33	35	40	54	59
60	66	90	111	115

Class Activity 2: Diagramming Divisibility

Work with your partner and use the Venn diagram below to design your own Diagramming Divisibility activity sheet. Be sure to create an answer key so when you share it with the class you can help with the solutions.



Direct Instruction

Factor Trees

Explain to students that many math processes call for finding the factors of numbers—numbers that can be multiplied to produce the original number. Some call for finding the greatest common factor, or GCF, of two numbers. Some call for the prime factors of a number.

There are several ways to find factors. One that can help visually keep track of all the factors is called a factor tree. This is a diagram with a vaguely treelike shape. It uses "branches" to show the factors of a number.

Before looking any further at factor trees, review some terms. Students probably know that all whole numbers other than 1 can be written as the product of factors. A prime number is a number that has only two factors, itself and 1. An example of a prime number is 13. Its only factors are 13 and 1. A composite number is a number that has more than two factors. An example of a composite number is 6. Its factors include 6, 3, 2, and 1. Prime factors are factors that are also prime numbers. The greatest common factor (GCF) of two numbers is the largest number that is a factor of both numbers.

Talk students through the process of making a factor tree. To create a factor tree, start by writing the number to be factored on the board, or on a sheet of poster paper. The "tree" will spread out, so leave plenty of space on both sides. The larger the number you are factoring, the more space you will need.

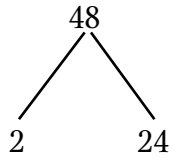
Think of two factors of the number. Write the factors below and a little to one side of the original number. Try to keep them on the same level as each other, otherwise your factor tree can get confusing as it goes on. Draw a short diagonal line to connect each factor to the original number.

One easy way to start finding factors is to start with the smallest prime numbers and see if any of them are factors. The smallest primes are 2, 3, 5, and 7. Here are some easy tricks to see if 2, 3, or 5 are factors of a number:

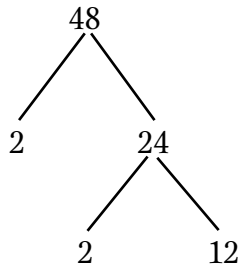
- If the last digit of a number is either 0 or an even number, the number is divisible by 2, so 2 is a factor.
- If the sum of the digits of a number is divisible by 3, the number is divisible by 3, so 3 is a factor.
- If the last digit of a number is either 0 or 5, the number is divisible by 5, so 5 is a factor.

For example, we can look at the number 30 and say immediately that it is divisible by 2 (last digit is 0), 3 (the sum of the digits is 3, which is divisible by 3), and 5 (the last digit is 0), so all three of these numbers are factors of 30.

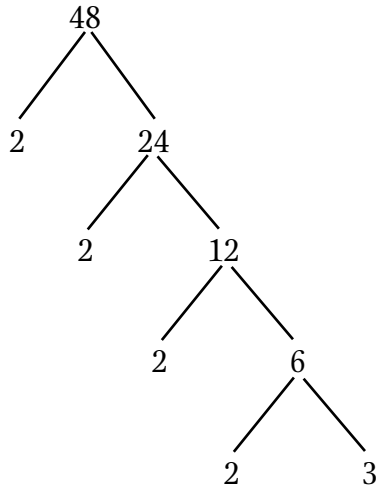
Tell students to try this approach with the number 48. Ask students if 2 is a factor of 48. The last digit of the number is 8, which is an even number. This means that 2 is a factor. To find the other factor that, when multiplied by 2, equals 48, divide 48 by 2. 48 ÷ 2 = 24. We can write 2 and 24 as factors of 48. Write the factors below the original number. Connect each factor to the original number with short diagonal lines.



Next, ask students to look to see if these factors can be broken down any further. Tell them we know that 2 is a prime factor because it has only 2 factors, 1 and itself. What about 24? Again, start by seeing if 24 is divisible by 2. The last digit—4—is an even number, so 24 is divisible by 2. 24 ÷ 2 = 12. We can write 2 and 12 as factors of 24.



Continue this process, finding factors for each factor, until all your factors are prime numbers.

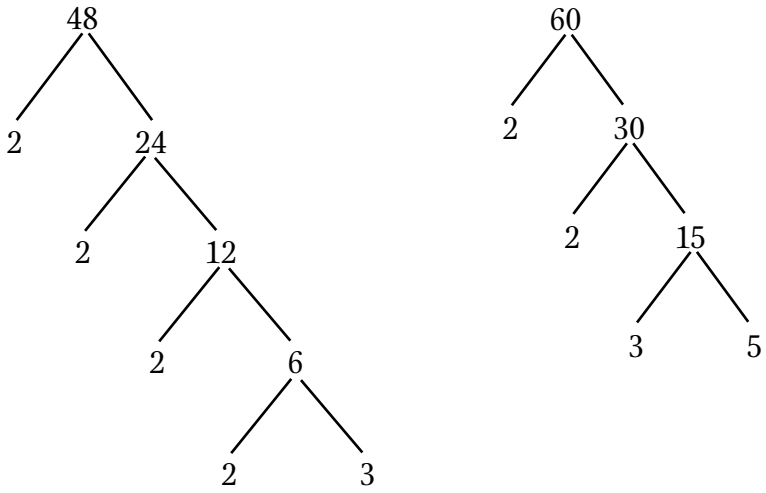


Ask students if any of these factors be broken down further. No, they are all prime numbers. We have factored 48 as far as we can.

Tell students the next step is to collect the factors from each step. Any number that is at the end of a "branch" in the "tree" is a prime factor. In this case, the prime factors of 48 are $2 \times 2 \times 2 \times 2 \times 3$.

Explain that when we have repeated multiplication of the same factor, it is customary to use exponents as a kind of shorthand. In the case of the prime factors of 48, 2 is a factor four times. We can write this as 2^4. We can then say that 48 is the product of $2^4 \times 3$.

We can use prime factors to find the greatest common factor (GCF) of two numbers. Let's say we need to find the GCF for 48 and 60. Look at the factor trees for both numbers.



The prime factors of 48 are $2 \times 2 \times 2 \times 2 \times 3$. The prime factors of 60 are $2 \times 2 \times 3 \times 5$. What prime factors do they have in common? Both include two 2s and one 3. This means that the GCF of both numbers is $2 \times 2 \times 3$, or 12.

Review the steps in creating a factor tree.

1. Write the number to be factored.
2. See if 2 is a factor of the number. If it is, write 2 a little below and to one side of the number. Connect it to the number with a short diagonal line. Divide the number by 2 to find the other factor that, when multiplied by 2, produces the number. Write it below the number in the same way you wrote 2. If 2 is not a factor, try the other small primes: 3, 5, and 7.
3. Repeat step 2 on the factors you identified in step 2. Write the new factors in the same way, connecting them to the number they factor with short diagonal lines.
4. Continue factoring until all your factors are prime numbers.
5. Collect the factors, and write them using exponential notation to show repeated multiplication of the same factor.

Introduction

This section includes a collection of station-based activities to provide students with opportunities to practice and apply the mathematical skills and concepts they are learning. It contains five sets of activities for each of the four strands: Number Sense, Concepts, and Operations; Geometry and Spatial Sense; Measurement; Algebraic Thinking; and Data Analysis and Probability. You may use these activities in addition to the direct instruction lessons, or, especially if the pre-test or other formative assessment suggests it, instead of direct instruction in areas where students have the basic concepts but need practice. The debriefing discussions after each set of activities provide an important opportunity to help students reflect on their experiences and synthesize their thinking. It also provides an additional opportunity for ongoing, informal assessment to guide instructional planning.

Implementation Guide

The following guidelines will help you prepare for and use the activity sets in this section.

Setting Up the Stations

Each activity set consists of four stations. Set up each station at a desk, or at several desks pushed together, with enough chairs for a small group of students. Place a card with the number of the station on the desk. Each station should also contain the materials specified in the teacher's notes, and a stack of Student Activity Sheets (one copy per student). Place the required materials (as listed) at each station.

When a group of students arrives at a station, each student should take one of the activity sheets to record the group's work. Although students should work together to develop one set of answers for the entire group, each student should record the answers on his or her own activity sheet. This helps keep students engaged in the activity and gives each student a record of the activity for future reference.

Forming Groups of Students

All activity sets consist of four stations. You might divide the class into four groups by having students count off from 1 to 4. If you have a large class and want to have students working in small groups, you might set up two identical sets of stations, labeled A and B. In this way, the class can be divided into eight groups, with each group of students rotating through the "A" stations or "B" stations.

Assigning Roles to Students

Students often work most productively in groups when each student has an assigned role. You may want to assign roles to students when they are assigned to groups and change the roles occasionally. Some possible roles are as follows:

- **Reader**—reads the steps of the activity aloud
- **Facilitator**—makes sure that each student in the group has a chance to speak and pose questions; also makes sure that each student agrees on each answer before it is written down
- **Materials Manager**—handles the materials at the station and makes sure the materials are put back in place at the end of the activity
- **Timekeeper**—tracks the group's progress to ensure that the activity is completed in the allotted time
- **Spokesperson**—speaks for the group during the debriefing session after the activities

Timing the Activities

The activities in this section are designed to take approximately 15 minutes per station. Therefore, you might plan on having groups change stations every 15 minutes, with a two-minute interval for moving from one station to the next. It is helpful to give students a "5-minute warning" before it is time to change stations.

Since the activity sets consist of four stations, the above timeframe means that it will take about an hour and 10 minutes for groups to work through all stations. If this is followed by a 20-minute class discussion as described below, an entire activity set can be completed in about 90 minutes.

Guidelines for Students

Before starting the first activity set, you may want to review the following "ground rules" with students. You might also post the rules in the classroom.

- All students in a group should agree on each answer before it is written down. If there is a disagreement within the group, discuss it with one another.
- You can ask your teacher a question only if everyone in the group has the same question.
- If you finish early, work together to write problems of your own that are similar to the ones on the Student Activity Sheet.
- Leave the station exactly as you found it. All materials should be in the same place and in the same condition as when you arrived.

Debriefing the Activities

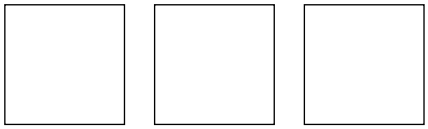
After each group has rotated through every station, bring students together for a brief class discussion. At this time you might have the groups' spokespersons pose any questions they had about the activities. Before responding, ask if students in other groups encountered the same difficulty or if they have a response to the question. The class discussion is also a good time to reinforce the essential ideas of the activities. The questions that are provided in the teacher's notes for each activity set can serve as a guide to initiating this type of discussion.

You may want to collect the Student Activity Sheets before beginning the class discussion. However, it can be beneficial to collect the sheets afterward so that students can refer to them during the discussion. This also gives students a chance to revisit and refine their work based on the debriefing session.

Station 1

You will find a number cube at this station. Use the number cube to create some three-digit numbers.

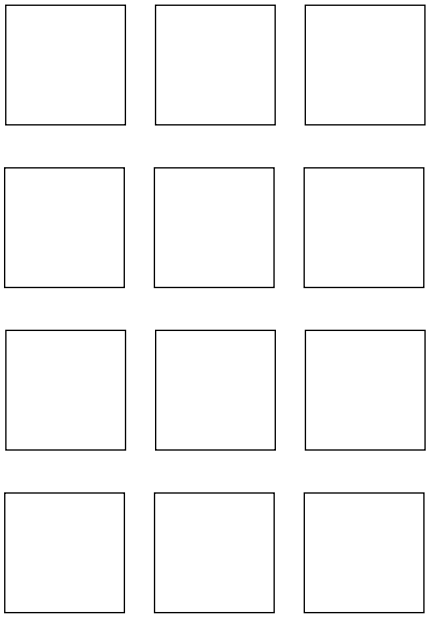
Roll the number cube three times. Write the numbers in the boxes below.



Work with other students to decide if this three-digit number is prime or composite. Write the answer on the line below.

_____

Repeat the process four more times.



_____

_____

_____

_____

Write at least three strategies you could use to help you decide whether a number is prime or composite.

_____

_____

_____

_____

_____

Station 3

You will find three highlighters at this station. Use one highlighter to highlight all the numbers in the grid that are multiples of 3. Use another highlighter to highlight all the numbers in the grid that are multiples of 5. Use the last highlighter to highlight all the numbers in the grid that are multiples of 6.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Work together to check that you have highlighted the multiples correctly.

1. Which numbers are highlighted in all three colors? _____

2. What can you say about these numbers? _____

_____

_____

3. Explain how to use your work to find the least common multiple of 3, 5, and 6.

_____

_____

_____