

Dinah Zike's Teaching Mathematics with



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Teaching Mathematics with Foldables

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Table of Contents

| | |
|----------------------------------|---|
| Letter from Dinah Zike | v |
|----------------------------------|---|

Introduction to Foldables

| | |
|---|-----|
| Why Use Foldables in Mathematics? | vi |
| Correlation of Foldables to <i>Glencoe Mathematics</i> | vii |
| Foldable Basics | 1 |
| Selecting the Appropriate Foldable | 3 |

Folding Instructions

| | |
|--|---|
| <i>Basic Foldable Shapes</i> | 5 |
|--|---|

1-Part Folds

| | |
|------------------------|---|
| Half Book | 6 |
| Folded Book | 7 |
| Bound Book | 8 |
| Two-Tab Book | 9 |

2-Part Folds

| | |
|------------------------|----|
| Matchbook | 10 |
| Pocket Book | 11 |
| Shutter Fold | 12 |

3-Part Folds

| | |
|-------------------------------------|----|
| Trifold Book | 13 |
| Three-Tab Book | 14 |
| Three-Tab Book Variations | 15 |
| Pyramid Fold or Mobile | 16 |

4-Part Folds

| | |
|-----------------------------|----|
| Layered-Look Book | 17 |
| Four-Tab Book | 18 |
| Envelope Fold | 19 |
| Standing Cube | 20 |
| Four-Door Book | 21 |
| Top-Tab Book | 22 |
| Accordion Book | 24 |

Any Number of Parts

| | |
|---|----|
| Pop-Up Book | 25 |
| Folding into Fifths | 26 |
| Folded Table, Chart, or Graph | 27 |
| Folding a Circle into Tenths | 28 |
| Circle Graph | 29 |
| Concept-Map Book | 30 |
| Vocabulary Book | 31 |

Projects Using Folds

| | |
|---------------------------------|----|
| Billboard Project | 32 |
| Sentence-Strip Holder | 33 |
| Sentence Strips | 34 |

Math Activities using Foldables

Number Systems

| | |
|--|----|
| Whole Numbers | 35 |
| Integers | 36 |
| Integers: Adding and Subtracting | 37 |
| Integers: Multiplying and Dividing | 38 |
| Rational Numbers | 39 |
| Rational Numbers: Fractions | 40 |
| Rational Numbers: Decimals | 41 |
| Percents | 42 |
| Ratios | 43 |
| Proportions | 43 |
| Irrational Numbers | 44 |
| Real Number System | 44 |

Algebraic Patterns and Functions

| | |
|-------------------------------------|----|
| Sets and Variables | 45 |
| Expressions | 46 |
| Properties | 47 |
| Equations | 48 |
| Inequalities | 49 |
| Relations and Functions | 50 |
| Factors | 51 |
| Multiples | 52 |
| Monomials and Polynomials | 53 |
| Powers and Exponents | 54 |
| Sequences | 55 |
| Matrices | 56 |

Geometry

| | |
|---------------------------------------|----|
| Points | 57 |
| Lines and Line Segments | 57 |
| Rays | 57 |
| Angles | 58 |
| Angle Relationships | 58 |
| Planes | 59 |
| Polygons | 60 |
| Triangles | 61 |
| Right Triangles | 62 |
| Right Triangle Trigonometry | 63 |

| | | | |
|---|----|--|----|
| Quadrilaterals | 64 | Permutations | 81 |
| Squares, Rectangles, and Rhombi | 65 | Combinations | 81 |
| Parallelograms | 66 | Probability | 82 |
| Trapezoids | 67 | Scatter Plots | 83 |
| Circles | 68 | Problem Solving | |
| Three-Dimensional Figures | 69 | Problem-Solving Plan | 84 |
| Prisms and Cylinders | 70 | Problem-Solving Strategies | 84 |
| Pyramids and Cones | 71 | Communication | |
| Coordinate Geometry | 72 | Vocabulary and Writing Definitions | 85 |
| Slope | 73 | Journals | 85 |
| Graphing Equations and Inequalities | 74 | Outline, List, and Sequence | 86 |
| Measurement | | Concept Maps | 86 |
| Metric Measurement | 75 | Writing Instructions | 86 |
| Length, Width, and Height | 75 | Main Ideas and Note Taking | 87 |
| Distance | 76 | Annotations | 87 |
| Weight | 76 | Questioning | 87 |
| Volume | 77 | Representation | |
| Temperature | 77 | Tables and Charts | 88 |
| Data Analysis and Probability | | Circle Graphs | 88 |
| Statistics | 78 | Bar Graphs and Histograms | 89 |
| Stem-and-Leaf Plots | 79 | Line Graphs | 89 |
| Box-and-Whisker Plots | 79 | Pictographs | 90 |
| Fundamental Counting Principle | 80 | Venn Diagrams | 90 |
| Frequency Tables | 80 | Index | 91 |
| Pascal's Triangle | 80 | | |

Dear Teacher,

In this book, you will find instructions for making Foldables as well as ideas on how to use them. They are an excellent communication tool for students and teachers.

National Math Standards and Communication Skills

The Principles and Standards for School Mathematics, published by the National Council of Teachers of Mathematics (NCTM) in 2000, stress the importance of communication skills in a strong mathematics program. Not all students will become mathematicians, engineers, or statisticians, but all students need to be able to think, analyze, and problem solve using skills acquired through the study of mathematics.

Throughout their lives, students will be called upon to be literate in mathematics—personally and professionally. They will need to have a basic understanding of numbers, operations, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry; measurement; and probability and statistics to solve real-life problems involving finances, chance, design, science, fine arts, and more.

Furthermore, students must be able to share the results of their use of mathematics using various forms of oral and written communication. Foldables are one of many techniques that can be used to integrate reading, writing, thinking, organizing data, researching, and other communication skills into an interdisciplinary mathematics curriculum.

Who, What, When, Why

You probably have seen at least one of the Foldables featured in this book used in supplemental programs or staff-development workshops. Today, my Foldables are used internationally. I present workshops and keynotes to over fifty thousand teachers and parents a year, sharing the Foldables that I began inventing, designing, and adapting over thirty years ago. Around the world, students of all ages are using them for daily work, note-taking activities, student-directed projects, forms of alternative assessment, math journals, graphs, charts, tables, and more.

Add and Amend

After workshop presentations, participants would ask me for lists of activities to be used with the Foldables they had just learned to make. They needed help visualizing how to convert math data into Foldables. So, over fifteen years ago, I began collecting and sharing the ideas listed in this book. The ideas are organized by topic. The table for each topic shows the math content being addressed and an appropriate Foldable. I hope you enjoy making Foldables a part of your math classroom!



Why Use Foldables in Mathematics?

When teachers ask me why they should take time to use the Foldables featured in this book, I explain that they

- . . . quickly organize, display, and arrange information, making it easier for students to grasp math concepts and master skills.
- . . . result in student-made study guides that are compiled as students listen for main ideas, read for main ideas, and work their way through new concepts and procedures.
- . . . provide a multitude of creative formats in which students can present projects, research, and computations instead of typical poster board or math fair formats.
- . . . replace teacher-generated writing or photocopied sheets with student-generated print.
- . . . incorporate the use of such skills as comparing and contrasting, recognizing cause and effect, and finding similarities and differences into daily work and long-term projects. For example, these Foldables can be used to compare and contrast student explanations and procedures for solving problems to the explanations presented by other students and teachers.
- . . . continue to “immerse” students in previously learned vocabulary and concepts, providing them with a strong foundation that they can build upon with new observations, experiences, and knowledge.
- . . . can be used by students or teachers to easily communicate data through graphs, tables, charts, models, and diagrams, including Venn diagrams.
- . . . allow students to make their own math journals for recording main ideas, problem-solving strategies, examples, questions that arise during classwork, and personal experiences that occur during learning.
- . . . can be used as alternative assessment tools by teachers to evaluate student progress or by students to evaluate their own progress.
- . . . integrate language arts, the sciences, and social sciences into the study of mathematics.
- . . . provide a sense of student ownership in the mathematics curriculum.

Correlation of Foldables™ to Glencoe Mathematics

| Foldable™ Topic | <i>Mathematics: Applications and Connections, Course 1</i> | <i>Mathematics: Applications and Connections, Course 2</i> | <i>Mathematics: Applications and Connections, Course 3</i> | <i>Pre-Algebra</i> | <i>Algebra 1</i> | <i>Geometry</i> | <i>Algebra 2</i> |
|------------------------------------|--|--|--|--------------------|------------------|-----------------|------------------|
| Number Systems | | | | | | | |
| Whole Numbers | ✓ | ✓ | ✓ | ✓ | | | |
| Integers | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| Integers: Adding and Subtracting | ✓ | ✓ | ✓ | ✓ | | | |
| Integers: Multiplying and Dividing | ✓ | ✓ | ✓ | ✓ | | | |
| Rational Numbers | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| Rational Numbers: Fractions | ✓ | ✓ | ✓ | ✓ | | | |
| Rational Numbers: Decimals | ✓ | ✓ | ✓ | ✓ | | | |
| Percents | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| Ratios | ✓ | ✓ | ✓ | ✓ | | | |
| Proportions | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| Irrational Numbers | | | | ✓ | ✓ | | ✓ |
| Real Number System | | | | ✓ | ✓ | | ✓ |
| Patterns and Functions | | | | | | | |
| Sets and Variables | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| Expressions | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| Properties | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| Equations | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| Inequalities | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| Relations and Functions | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| Factors | ✓ | ✓ | | ✓ | ✓ | | |
| Multiples | ✓ | ✓ | | ✓ | ✓ | | |
| Monomials and Polynomials | | | ✓ | ✓ | ✓ | | ✓ |
| Powers and Exponents | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| Sequences | | | | ✓ | ✓ | ✓ | ✓ |
| Matrices | | | ✓ | | ✓ | ✓ | ✓ |
| Geometry | | | | | | | |
| Points | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Lines and Line Segments | | | ✓ | ✓ | | ✓ | |
| Rays | | | | | | ✓ | |
| Angles | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ |
| Angle Relationships | | | | | | ✓ | |
| Planes | | | | | | ✓ | |
| Polygons | ✓ | ✓ | ✓ | ✓ | | ✓ | |
| Triangles | ✓ | ✓ | ✓ | ✓ | | ✓ | |
| Right Triangles | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

Correlation of Foldables™ to Glencoe Mathematics

| Foldable™ Topic | <i>Mathematics: Applications and Connections, Course 1</i> | <i>Mathematics: Applications and Connections, Course 2</i> | <i>Mathematics: Applications and Connections, Course 3</i> | <i>Pre-Algebra</i> | <i>Algebra 1</i> | <i>Geometry</i> | <i>Algebra 2</i> |
|--------------------------------------|--|--|--|--------------------|------------------|-----------------|------------------|
| Algebra and Right Triangles | | | | ✓ | ✓ | ✓ | ✓ |
| Quadrilaterals | ✓ | ✓ | | ✓ | | ✓ | |
| Squares, Rectangles, and Rhombi | ✓ | ✓ | ✓ | ✓ | | ✓ | |
| Parallelograms | ✓ | ✓ | | ✓ | | ✓ | |
| Trapezoids | | ✓ | ✓ | ✓ | | ✓ | |
| Circles | ✓ | ✓ | ✓ | ✓ | | ✓ | |
| Three-Dimensional Figures | ✓ | ✓ | ✓ | ✓ | | ✓ | |
| Prisms and Cylinders | ✓ | ✓ | ✓ | ✓ | | ✓ | |
| Pyramids and Cones | | | ✓ | ✓ | | ✓ | |
| Coordinate Geometry | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Slope | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Graphing Equations and Inequalities | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Measurement | | | | | | | |
| Metric Measurement | ✓ | | | | | | |
| Length, Width, and Height | ✓ | | | | | | |
| Distance | ✓ | | | | | | |
| Weight | ✓ | | | | | | |
| Volume | ✓ | | | | | | |
| Temperature | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| Data Analysis and Probability | | | | | | | |
| Statistics | | | | | | | |
| Stem-and-Leaf Plots | ✓ | | | | | | |
| Box-and-Whisker Plots | | ✓ | | ✓ | ✓ | | |
| Fundamental Counting Principle | | ✓ | ✓ | ✓ | ✓ | | ✓ |
| Frequency Tables | ✓ | ✓ | ✓ | ✓ | | | |
| Pascal's Triangle | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Permutations | | ✓ | ✓ | ✓ | ✓ | | ✓ |
| Combinations | | ✓ | ✓ | ✓ | ✓ | | ✓ |
| Probability | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Scatter Plots | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Problem Solving | | | | | | | |
| Problem Solving Plan | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Problem Solving Strategies | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| Communication | | | | | | | |
| Vocabulary and Writing Definitions | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

Correlation of Foldables™ to Glencoe Mathematics

| Foldable™ Topic | <i>Mathematics: Applications and Connections, Course 1</i> | <i>Mathematics: Applications and Connections, Course 2</i> | <i>Mathematics: Applications and Connections, Course 3</i> | <i>Pre-Algebra</i> | <i>Algebra 1</i> | <i>Geometry</i> | <i>Algebra 2</i> |
|-----------------------------|--|--|--|--------------------|------------------|-----------------|------------------|
| Journals | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Outline, List, and Sequence | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Concept Map | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Writing Instructions | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Main Ideas and Note Taking | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Annotations | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Questioning | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Representation | | | | | | | |
| Tables and Charts | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Circle Graphs | ✓ | ✓ | ✓ | ✓ | | ✓ | |
| Bar Graphs and Histograms | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| Line Graphs | ✓ | ✓ | | | | | |
| Pictographs | ✓ | | | | | | |
| Venn diagrams | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

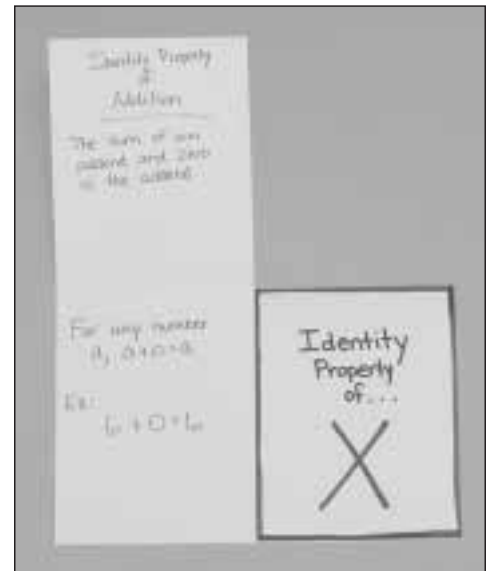
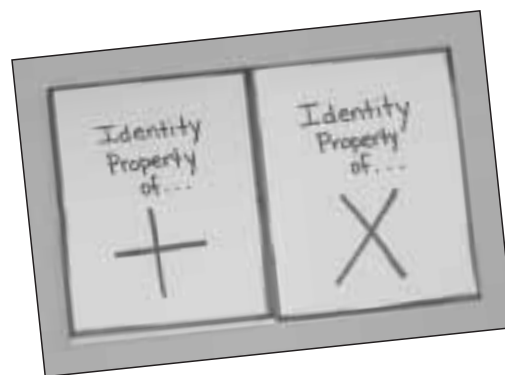
Foldable Basics

What to Write and Where

Teach students to write general information—titles, vocabulary words, concepts, questions, main ideas, and properties or theorems—on the front tabs of their Foldables. General information is viewed every time a student looks at a Foldable. Foldables help students focus on and remember key points without being distracted by other print.

Ask students to write specific information—supporting ideas, student thoughts, answers to questions, research information, computation steps, class notes, observations, and definitions—under the tabs.

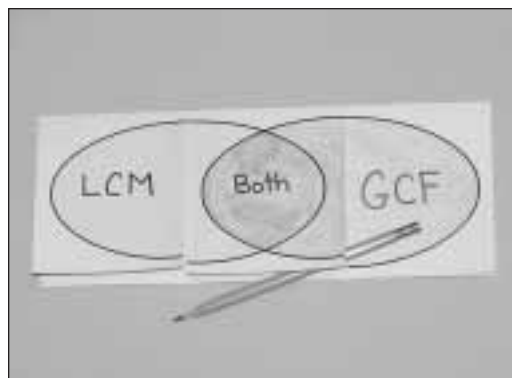
As you teach, demonstrate different ways in which Foldables can be used. Soon you will find that students make their own Foldables and use them independently for study guides and projects.



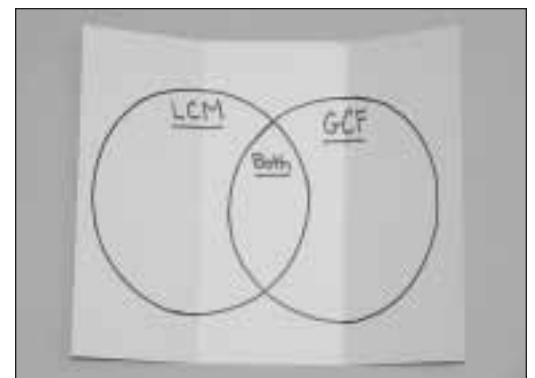
With or Without Tabs

Foldables with flaps or tabs create study guides that students can use to self check what they know about the general information on the front of the tabs. Use Foldables without tabs for assessment purposes or projects where information is presented for others to view quickly.

Venn Diagram used as a study guide



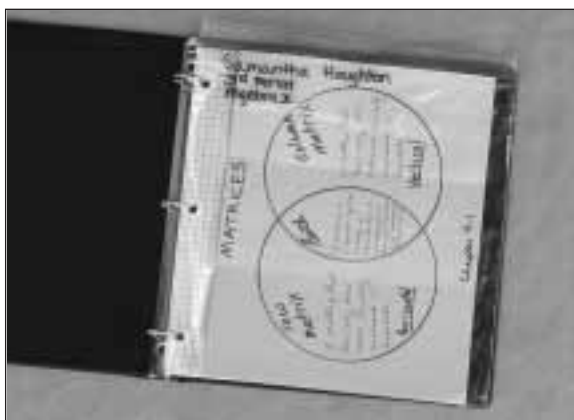
Venn Diagram used for assessment



What to Do with Scissors and Glue

I don't expect secondary students to bring glue and scissors to math class. Instead, I set up a small table in the classroom and provide several containers of glue, numerous pairs of scissors (sometimes tied to the table), containers of markers and colored pencils, a stapler, clear tape, and anything else I think students might need to make their Foldables. Don't be surprised if students donate unusual markers, decorative-edged scissors, gel pens, stencils, and other art items to your publishing table.

The more they make and use graphic organizers, the faster students become at producing them.



Storing Graphic Organizers in Student Portfolios

Turn one-gallon freezer bags into student portfolios which can be collected and stored in the classroom. Students can also carry their portfolios in their notebooks if they place strips of two-inch clear tape along one side and punch three holes through the taped edge.

Have each student write his or her name along the top of the plastic portfolio with a

permanent marker and cover the writing with two-inch clear tape to keep it from wearing off.

Cut the bottom corners off the bag so it won't hold air and will stack and store easily.

HINT: *I found it more convenient to keep student portfolios in my classroom so student work was always available when needed and not "left at home" or "in the car." Giant laundry-soap boxes make good storage containers for portfolios.*

Let Students Use This Book As an Idea Reference

Make this book available to students to use as an idea reference for projects, discussions, extra credit work, cooperative learning group presentations, and more.

Selecting the Appropriate Foldable

Dividing Math Concepts into Parts

Foldables divide information and make it visual. In order to select the appropriate Foldable, decide how many parts you want to divide the information into and then determine which Foldable best illustrates or fits those parts. Foldables that are three-dimensional also make the student interact with the information kinesthetically.

For example, if you are studying the Properties of Equality you could choose a Foldable that has five tabs (or sections). On the front tabs write the properties. Under the tabs, explain the properties in words on one side and in symbols on the other side.

| Math Concepts Already Divided into Parts | | | | | |
|--|---|-----------------|--|-----------------------------------|---|
| <i>Algebra</i> | | <i>Geometry</i> | | <i>Statistics and Probability</i> | |
| Parts | Concept | Parts | Concept | Parts | Concept |
| 5 | Properties of Equality | 2 | collinear and noncollinear | 3 | mean, median, mode |
| 3 | parentheses, brackets, and braces | 2 | complementary and supplementary angles | 1 | Fundamental Counting Principle |
| 2 | equations and inequalities | 2 | parallel and perpendicular | 4 | Who, What, When, Where: Blaise Pascal |
| 2 | numeric and algebraic expressions | 3 | translation, rotation, reflection | 2 | permutations and combinations |
| 2 | domain and range | 6 | types of triangles | 2 | upper quartile and lower quartile |
| 7 | properties of addition and multiplication | 4 | SSS, SAS, ASA, AAS | 2 | dependent and independent events |
| 2 | LCM and LCD | 2 | two types of special right triangles | 2 | probability and odds |
| 3 | monomials, binomials, and trinomials | 6 | types of quadrilaterals | 2 | odds in favor and odds against |
| 2 | powers and exponents | 2 | x -axis and y -axis | 2 | mutually inclusive and exclusive events |

| Math Concepts That Can Be Divided into Parts | | |
|--|-------------------------------|-----------------------------------|
| <i>Algebra</i> | <i>Geometry</i> | <i>Statistics and Probability</i> |
| write algebraic expressions | draw angles with a protractor | determine ranges of sets |
| evaluate expressions | classify polygons | interpret scatter plots |
| sequence steps | illustrate quadrilaterals | display data collected in plots |
| list algebraic rules | list examples of prisms | draw models of combinations |
| solve equations | name ordered pairs | |
| find values for variables | graph points | |

Dividing Skills and Foldables into Parts

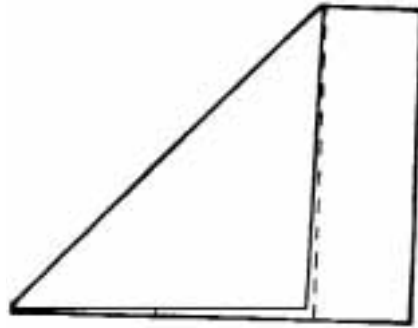
Reading, writing, and thinking skills can easily be used with Foldables. The following lists show examples of skills and activities and a selection of Foldables divided into parts. You may want to refer to this page as you select activities from the lists of math topics in this book. (See pages 35–90.)

| Skills and Activities Divided into Parts | |
|--|------------------------------|
| 1 Part | 2 Parts |
| Find the Main Idea | Compare and Contrast |
| Predict an Outcome | Cause and Effect |
| Narrative Writing | Similarities and Differences |
| Descriptive Writing | Opposite Operations |
| Expository Writing | |
| Persuasive Writing | |
| 3 Parts | 4 Parts |
| Venn Diagrams | Who, What, When, Where |
| Know?-Like to Know?-Learned? | What, Where, When, Why/How |
| Beginning, Middle, End | |
| Any Number of Parts | |
| Questioning | Making and Using Tables |
| Flow Charts | Making and Using Graphs |
| Vocabulary Words | Making and Using Charts |
| Timelines | Sequencing Data or Events |
| Concept Webs or Maps | |

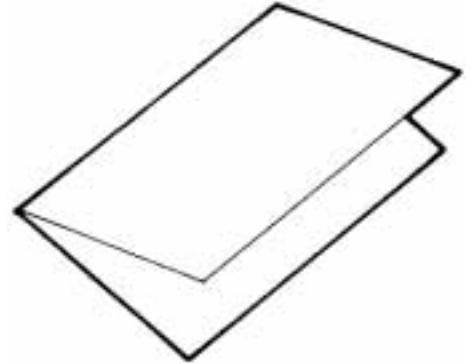
| Foldables Divided into Parts | |
|---|--------------------------------|
| 1 Part | 2 Parts |
| Half Book | Two-Tab Book |
| Folded Book | Pocket Book |
| Matchbook | Shutter Fold |
| Bound Book | Matchbook Cut in Half |
| | Concept-Map Book with Two Tabs |
| 3 Parts | 4 Parts |
| Trifold Book | Four-Tab Book |
| Three-Tab Book | Standing Cube |
| Pyramid Book | Top-Tab Book |
| Layered-Look Book | Four-Door Book |
| Concept Map with Three Tabs | |
| Any Number of Parts | |
| Accordion Book | Circle Graph |
| Layered-Look Book | Concept-Map Book |
| Sentence-Strip Holder | Vocabulary Book |
| Folded Table, Chart, or Graph | Bound Book |
| Pyramid Mobile | Pocket Books |
| Top-Tab Book (three or more sheets of paper) | |

Basic Foldable Shapes

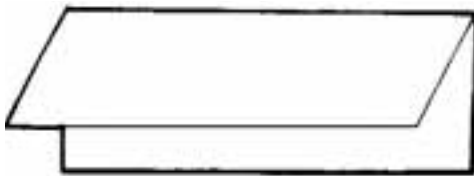
The following figures illustrate the basic folds that are referred to throughout the following section of this book.



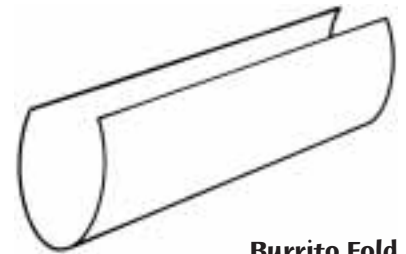
Taco Fold



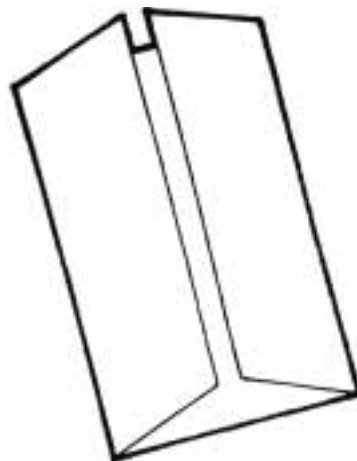
Hamburger Fold



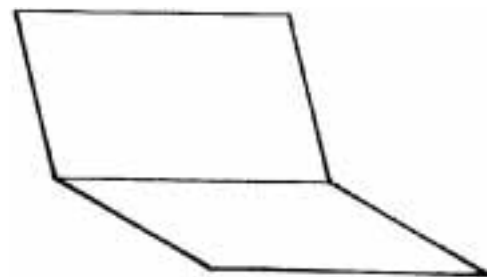
Hot Dog Fold



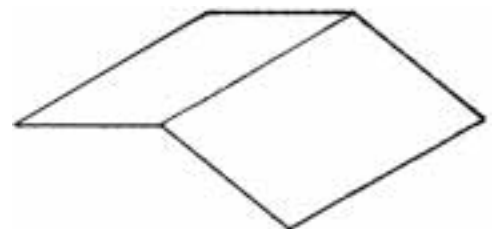
Burrito Fold



Shutter Fold



Valley Fold



Mountain Fold

Half Book

Fold a sheet of $8\frac{1}{2}" \times 11"$ paper in half.

1. This book can be folded vertically like a *hot dog* or . . .
2. . . it can be folded horizontally like a *hamburger*.

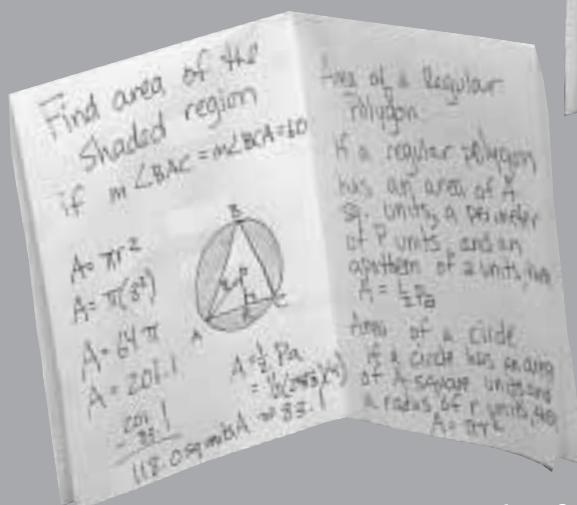
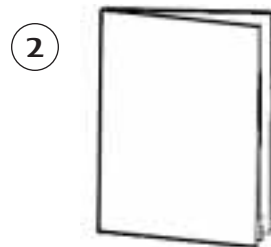
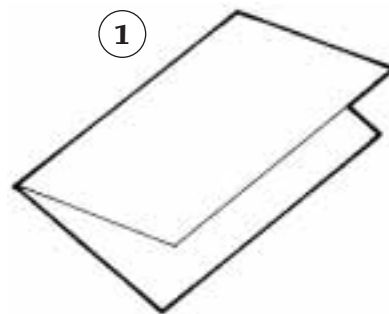
Use this book for descriptive, expository, persuasive, or narrative math writing, as well as graphs, diagrams, or charts.



Folded Book

1. Make a *half book*.
2. Fold it in half again like a *hamburger*. This makes a ready-made cover, and two small pages for information on the inside.

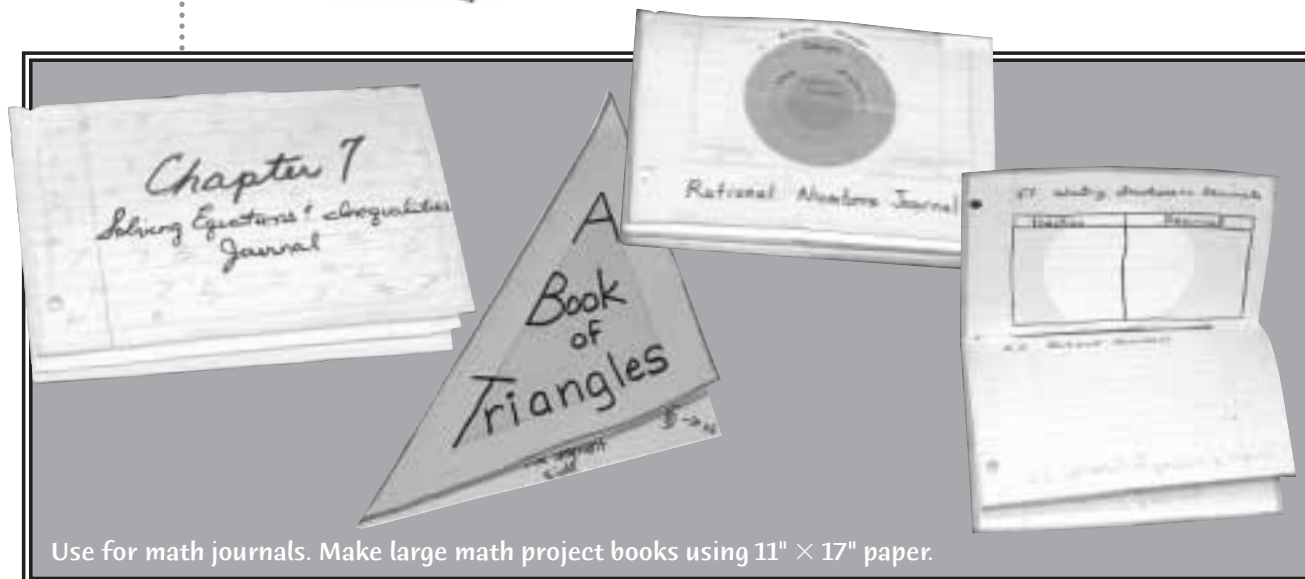
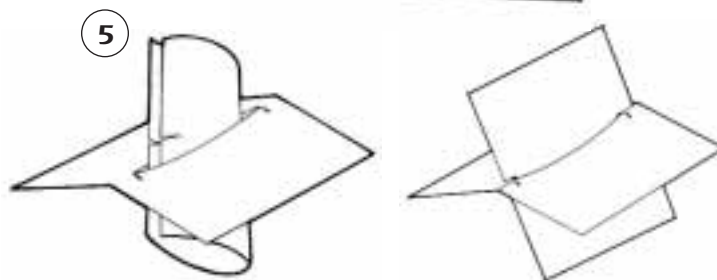
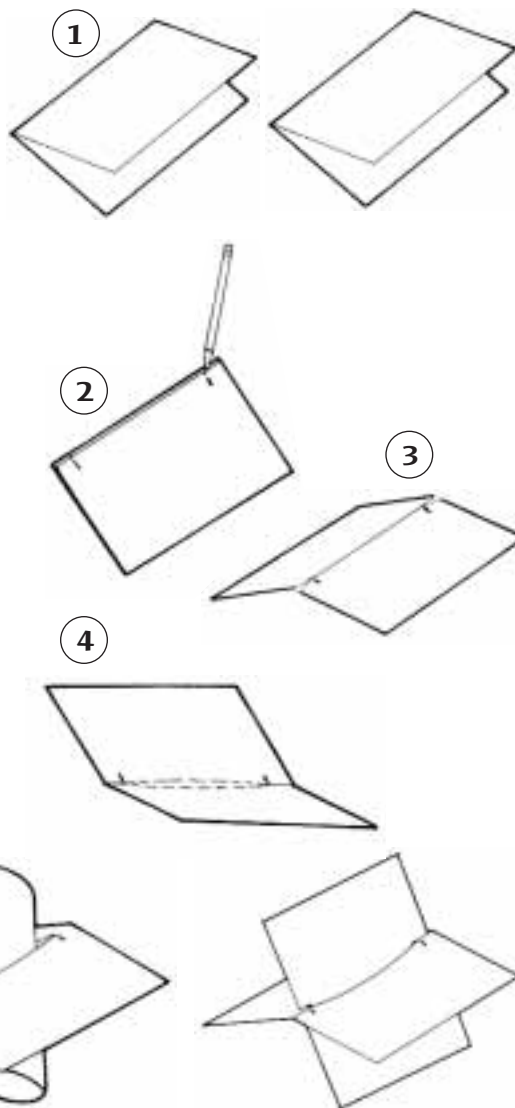
Use photocopied worksheets, Internet print outs, and student-drawn diagrams or maps to make this book. One sheet of paper can be used for two activities and two grades.



When folded, the photocopied sheet becomes a book for recording notes and questions.

Bound Book

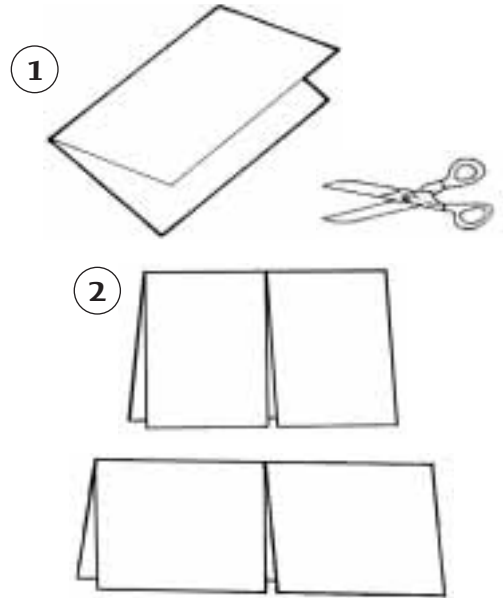
1. Take two sheets of $8\frac{1}{2}'' \times 11''$ paper and fold each one like a *hamburger*. Place the papers on top of each other, leaving one sixteenth of an inch between the *mountain tops*.
2. Mark both folds one inch from the outer edges.
3. On one of the folded sheets, cut from the top and bottom edge to the marked spot on both sides.
4. On the second folded sheet, start at one of the marked spots and cut the fold between the two marks.
5. Take the cut sheet from step 3 and fold it like a *burrito*. Place the *burrito* through the other sheet and then open the *burrito*. Fold the bound pages in half to form an eight-page book.



Two-Tab Book

1. Take a *folded book* and cut up the *valley* of the inside fold toward the *mountain top*. This cut forms two large tabs that can be used front and back for writing and illustrations.
2. The book can be expanded by making several of these folds and gluing them side-by-side.

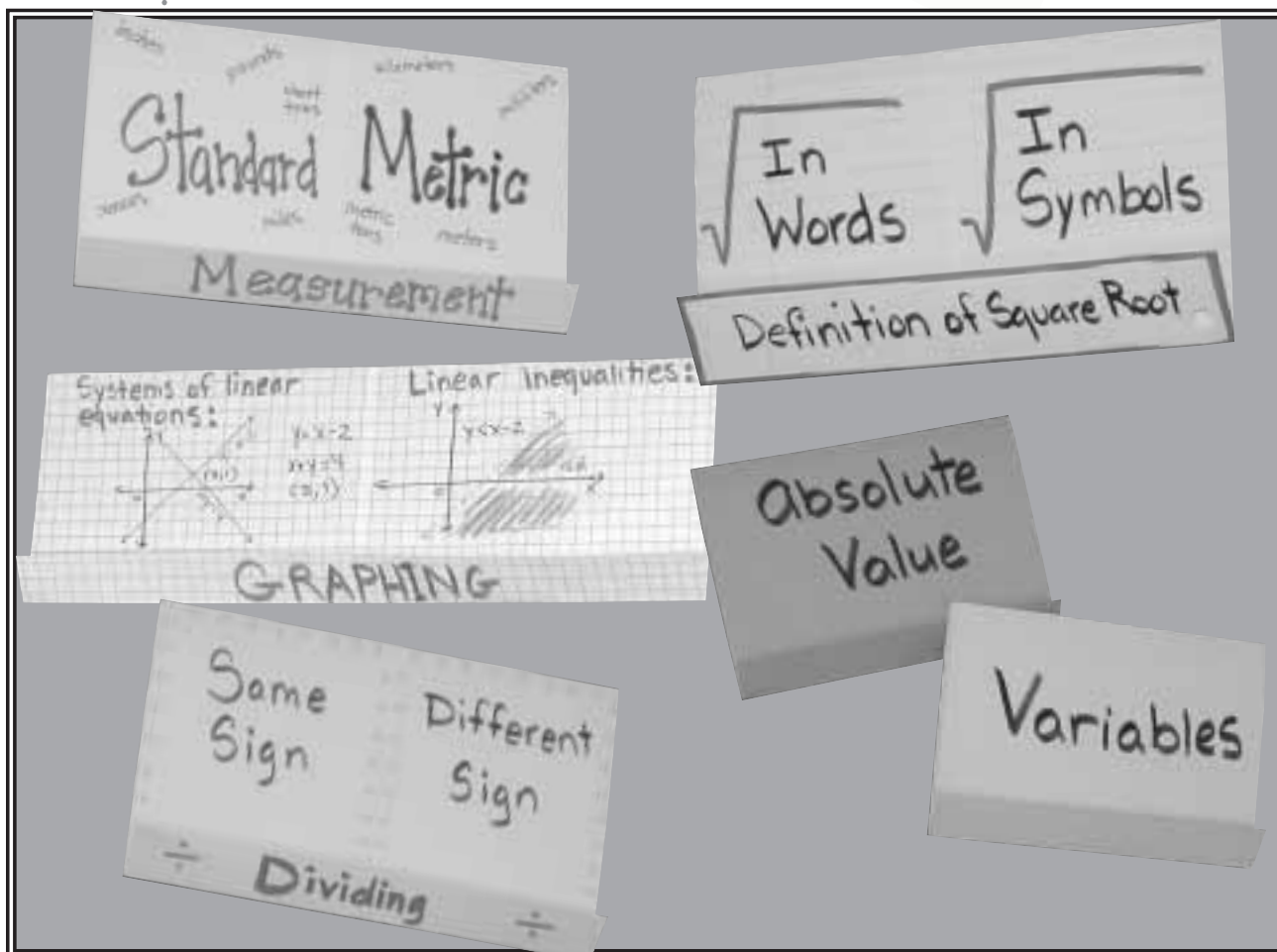
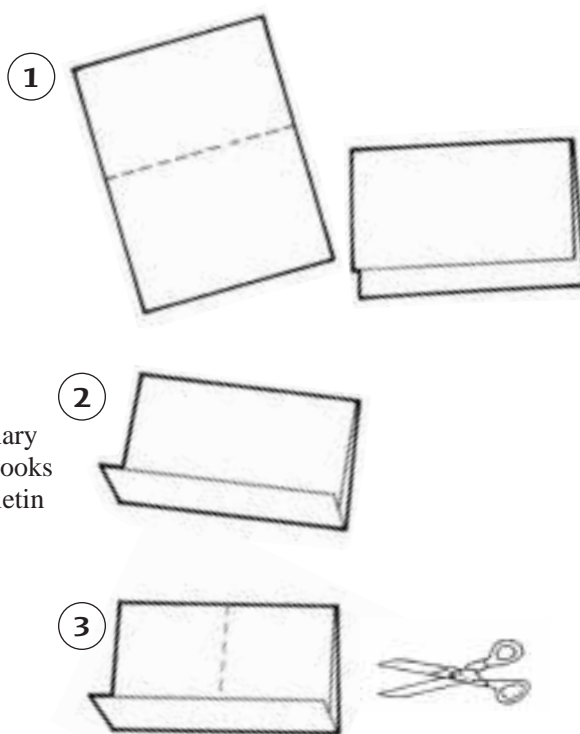
Use this book for data that occurs in twos, for example opposite operations.



Matchbook

1. Fold a sheet of $8\frac{1}{2}" \times 11"$ paper like a *hamburger*, but fold it so that one side is one inch longer than the other side.
2. Fold the one-inch tab over the short side forming an envelope-like fold.
3. Cut the front flap in half toward the *mountain top* to create two flaps.

Use this book to report on one or two vocabulary words, questions, or concepts. Collect matchbooks and use them to make great student-made bulletin boards.

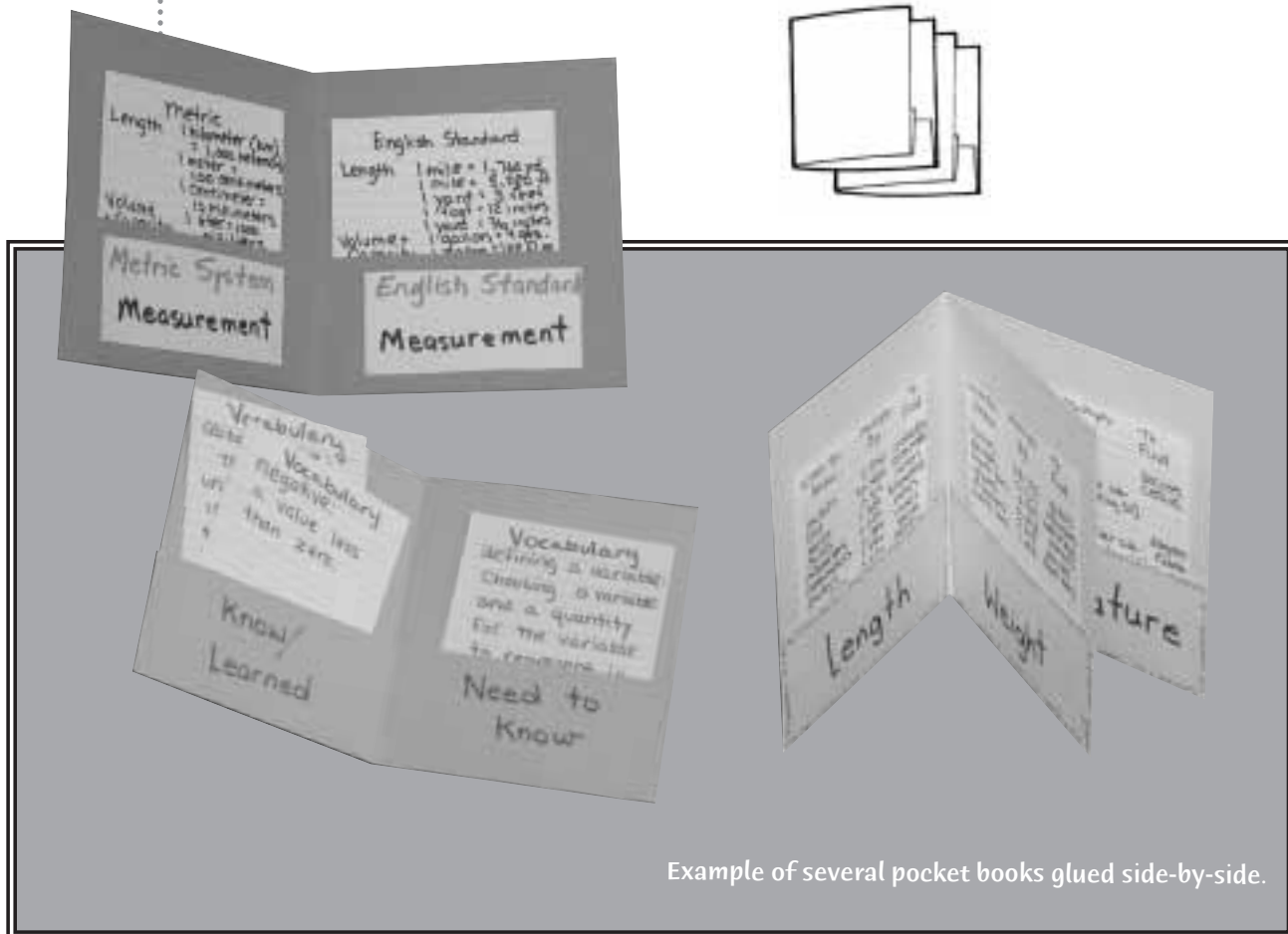
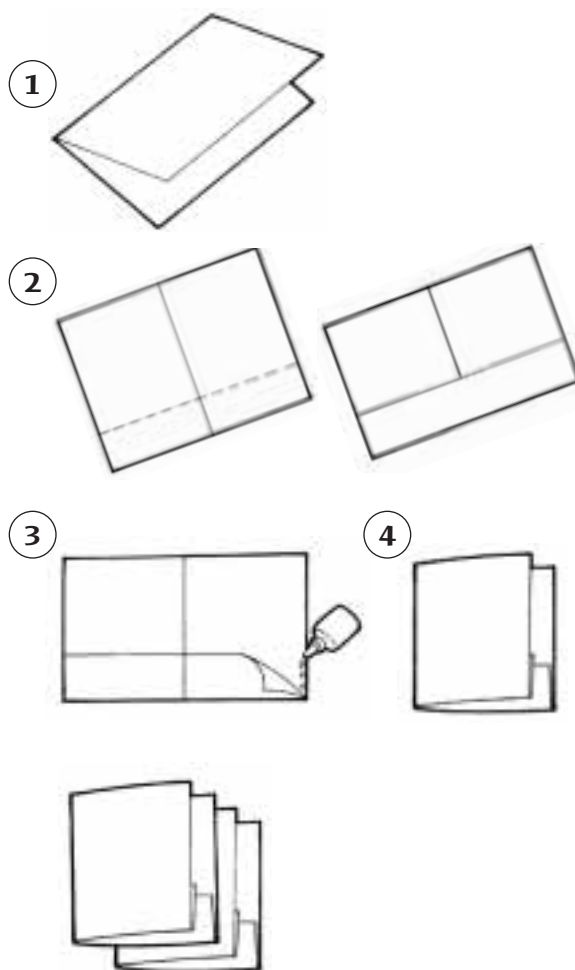


Pocket Book

1. Fold a sheet of $8\frac{1}{2}" \times 11"$ paper in half like a *hamburger*.
2. Open the folded paper and fold one of the long sides up two inches to form a pocket. Refold along the *hamburger* fold so that the newly formed pockets are on the inside.
3. Glue the outer edges of the two-inch fold with a small amount of glue.
4. **Optional:** Glue a cover around the *pocket book*.

Variation: Make a multi-paged booklet by gluing several pockets side-by-side. Glue a cover around the multi-paged *pocket book*.

Use $3" \times 5"$ index cards inside the pockets. Store student-made books, such as two-tab books and folded books in the pockets.



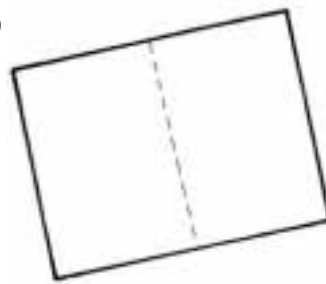
Example of several pocket books glued side-by-side.

Shutter Fold

1. Begin as if you were going to make a *hamburger* but instead of creasing the paper, pinch it to show the midpoint.
2. Fold the outer edges of the paper to meet at the pinch, or mid-point, forming a *shutter fold*.

Use this book for data occurring in twos. Or, make this fold using 11" × 17" paper and smaller books—such as the half book, journal, and two-tab book—that can be glued inside to create a large project full of student work.

1



2

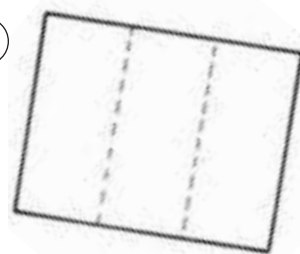


Trifold Book

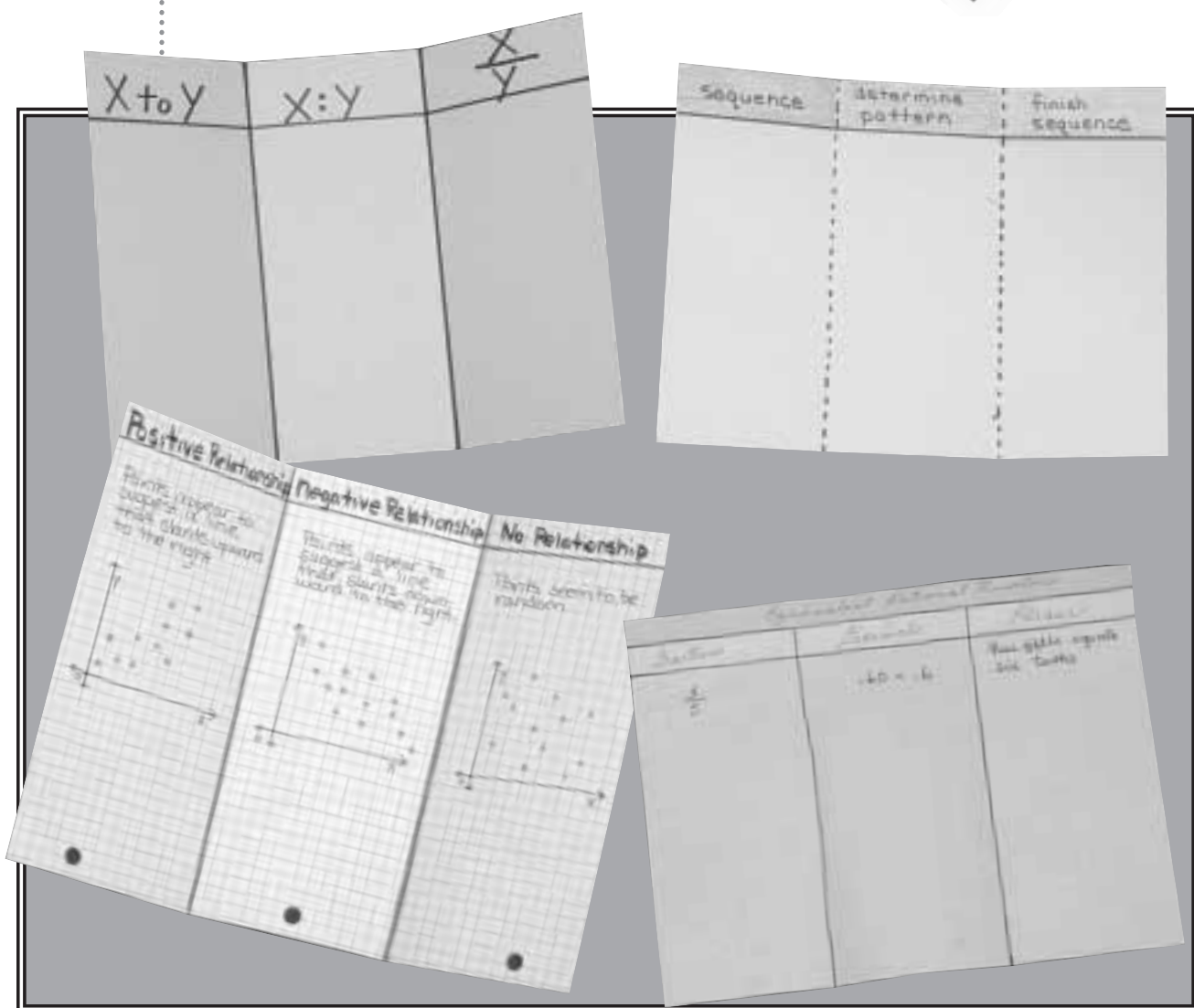
1. Fold a sheet of $8\frac{1}{2}'' \times 11''$ paper into thirds.
2. Use this book as is, or cut into shapes. If the trifold is cut, leave plenty of fold on both sides of the designed shape, so the book will open and close in three sections.

Use this book to make charts with three columns or rows, large Venn diagrams, or reports on data occurring in threes.

1



2



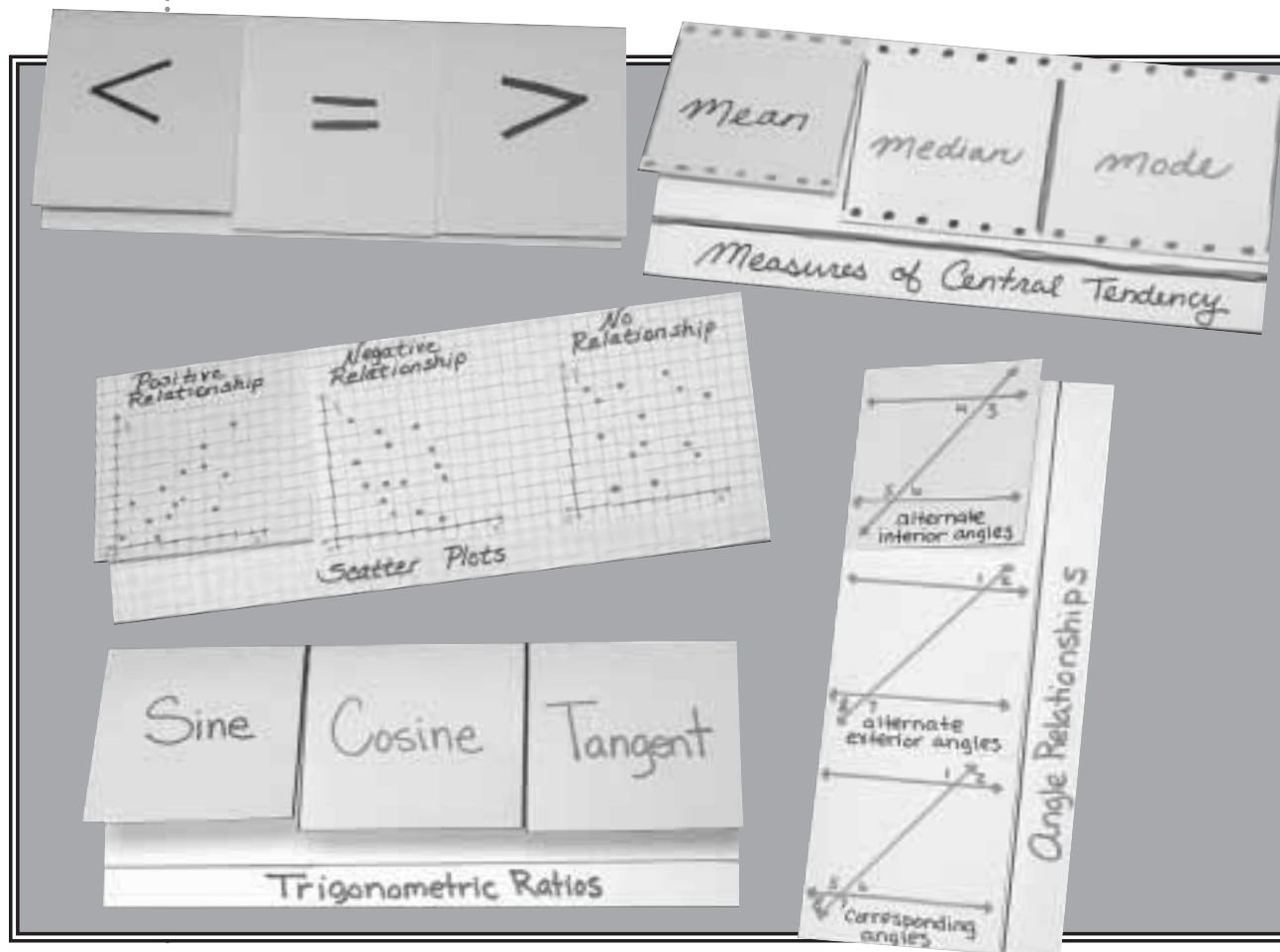
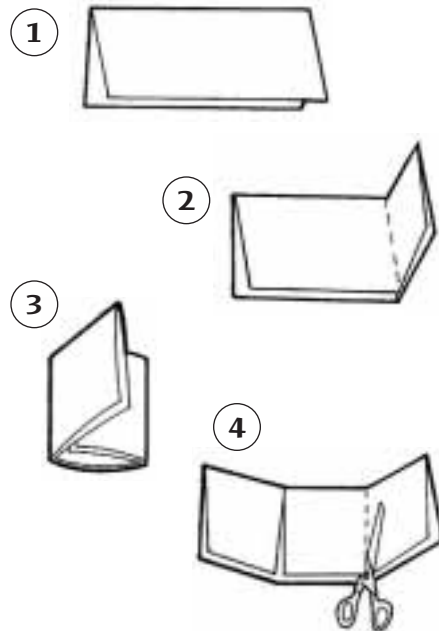
Three-Tab Book

1. Fold a sheet of paper like a *hot dog*.
2. With the paper horizontal, and the fold of the *hot dog* up, fold the right side toward the center, trying to cover one half of the paper.

NOTE: If you fold the right edge over first, the final graphic organizer will open and close like a book.

3. Fold the left side over the right side to make a book with three folds.
4. Open the folded book. Place your hands between the two thicknesses of paper and cut up the two *valleys* on one side only. This will form three tabs.

Use this book for data occurring in threes.



Three-Tab Book Variations

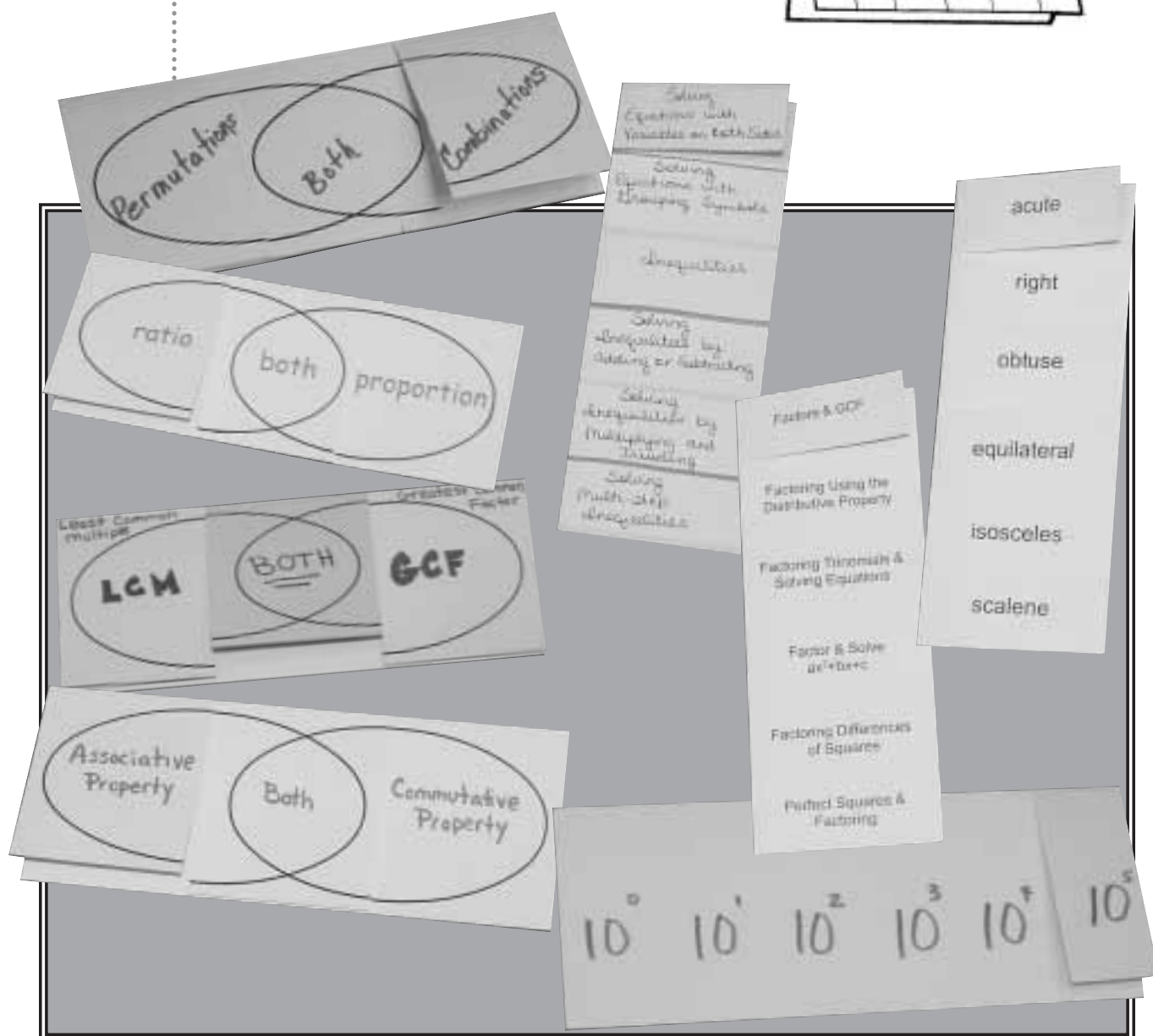
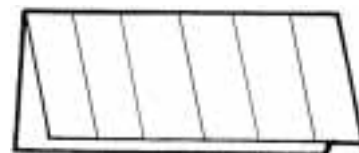
Variation A

Draw overlapping circles on the three tabs to make a Venn Diagram.



Variation B

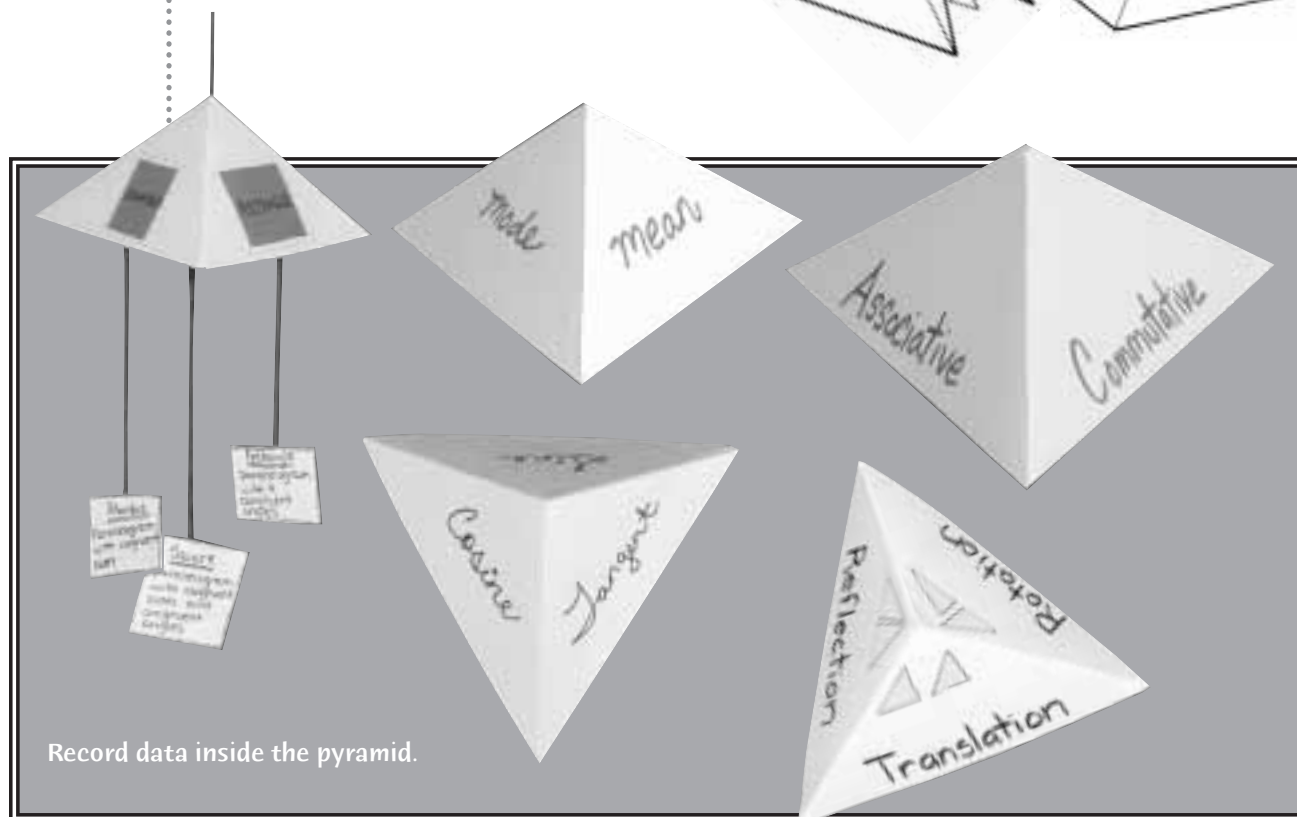
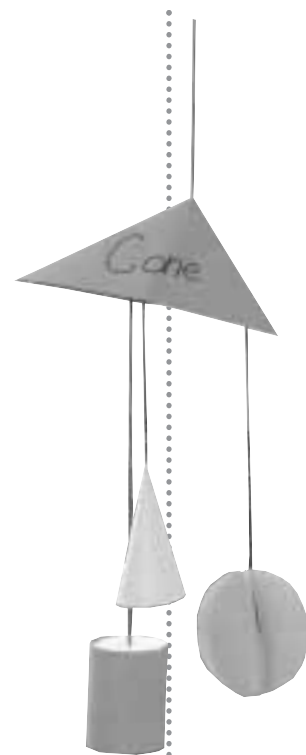
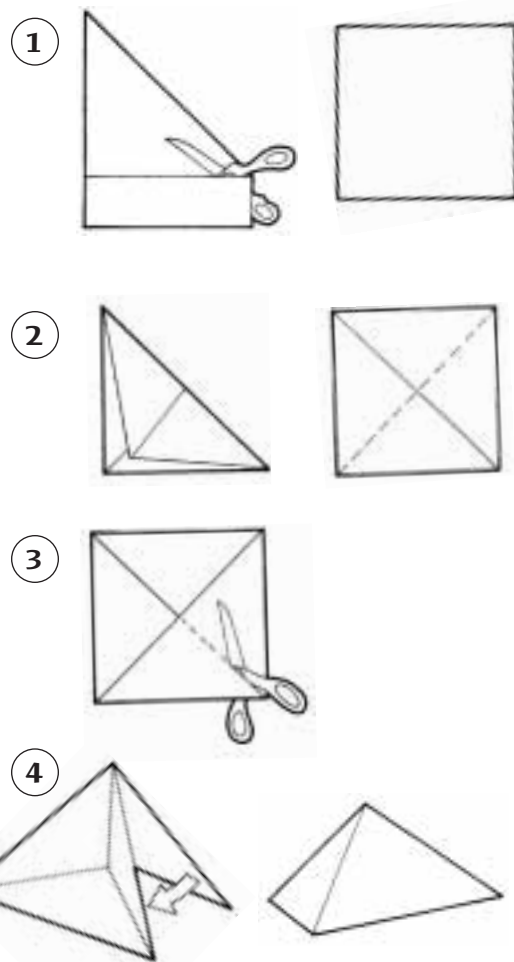
Cut each of the three tabs in half to make a six-tab book.



Pyramid Fold or Mobile

1. Fold a sheet of $8\frac{1}{2}'' \times 11''$ paper into a *taco*, forming a square. Cut off the excess rectangular tab formed by the fold.
2. Open the folded *taco* and refold it the opposite way forming another *taco* and an X-fold pattern.
3. Cut one of the folds to the center of the X, or the midpoint, and stop. This forms two triangular-shaped flaps.
4. Glue one of the flaps under the other, forming a *pyramid*.
5. Label front sections and write information, notes, thoughts, and questions inside the pyramid on the back of the appropriate tab.

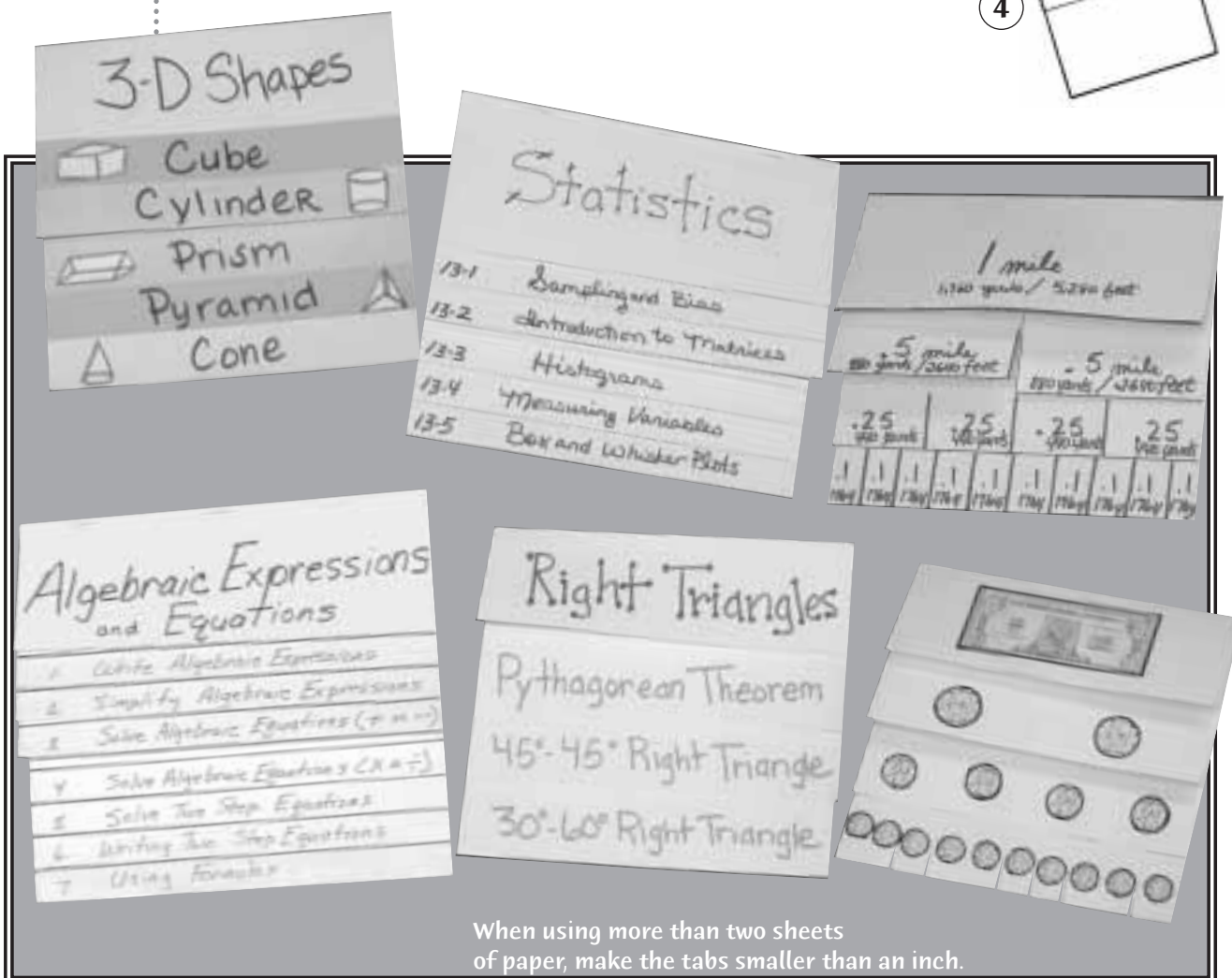
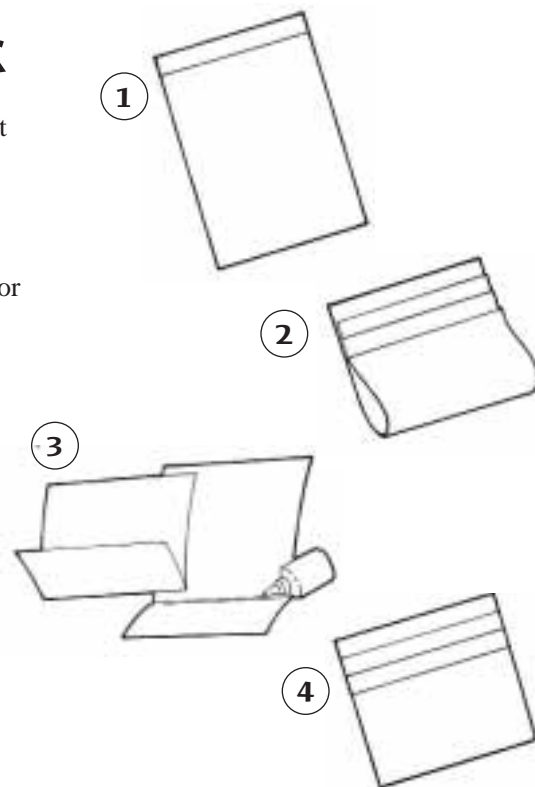
Use to make mobiles and dioramas.
Use with data occurring in threes.



Record data inside the pyramid.

Layered-Look Book

1. Stack two sheets of $8\frac{1}{2}" \times 11"$ paper so that the back sheet is one inch higher than the front sheet.
2. Bring the bottom of both sheets upward and align the edges so that all of the layers or tabs are the same distance apart.
3. When all tabs are an equal distance apart, fold the papers and crease well.
4. Open the papers and glue them together along the *valley* or inner center fold or, staple them along the mountain.

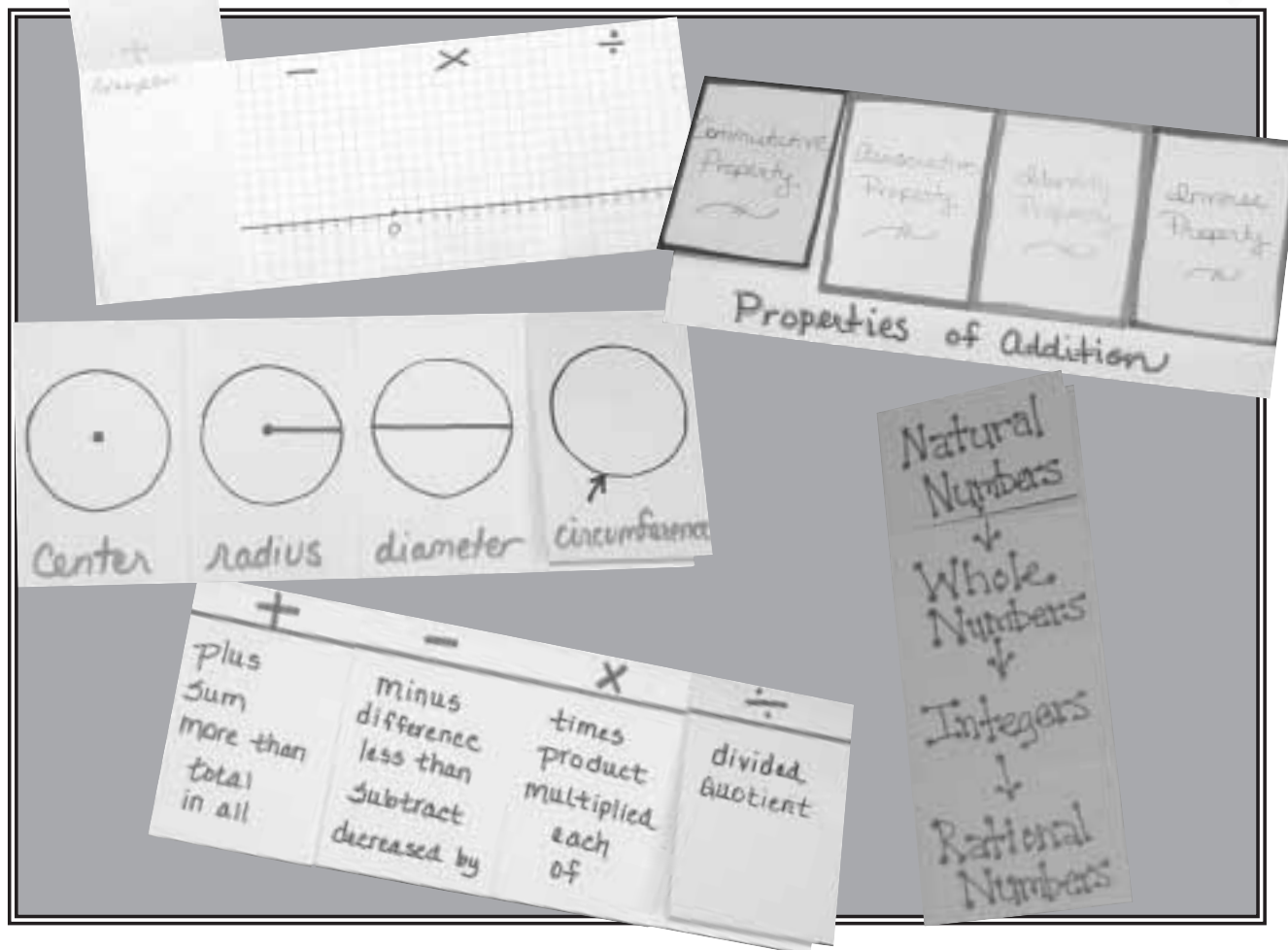
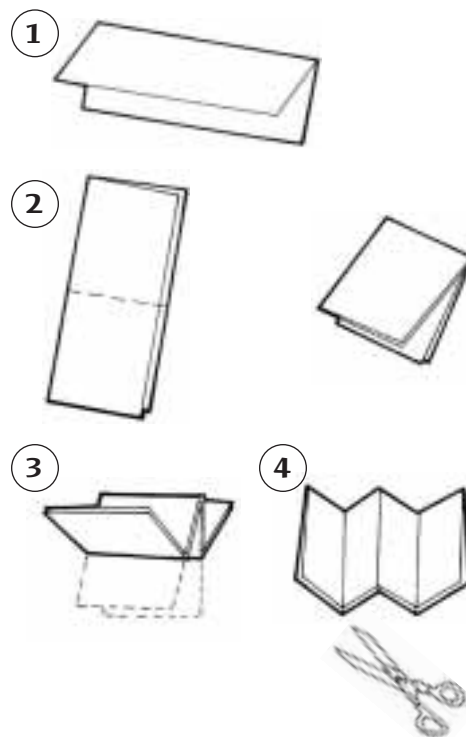


When using more than two sheets of paper, make the tabs smaller than an inch.

Four-Tab Book

1. Fold a sheet of $8\frac{1}{2}" \times 11"$ paper in half like a *hot dog*.
2. Fold this long rectangle in half like a *hamburger*.
3. Fold both ends back to touch the *mountain top* or fold it like an *accordion*.
4. On the side with two *valleys* and one *mountain top*, make vertical cuts through one thickness of paper, forming four tabs.

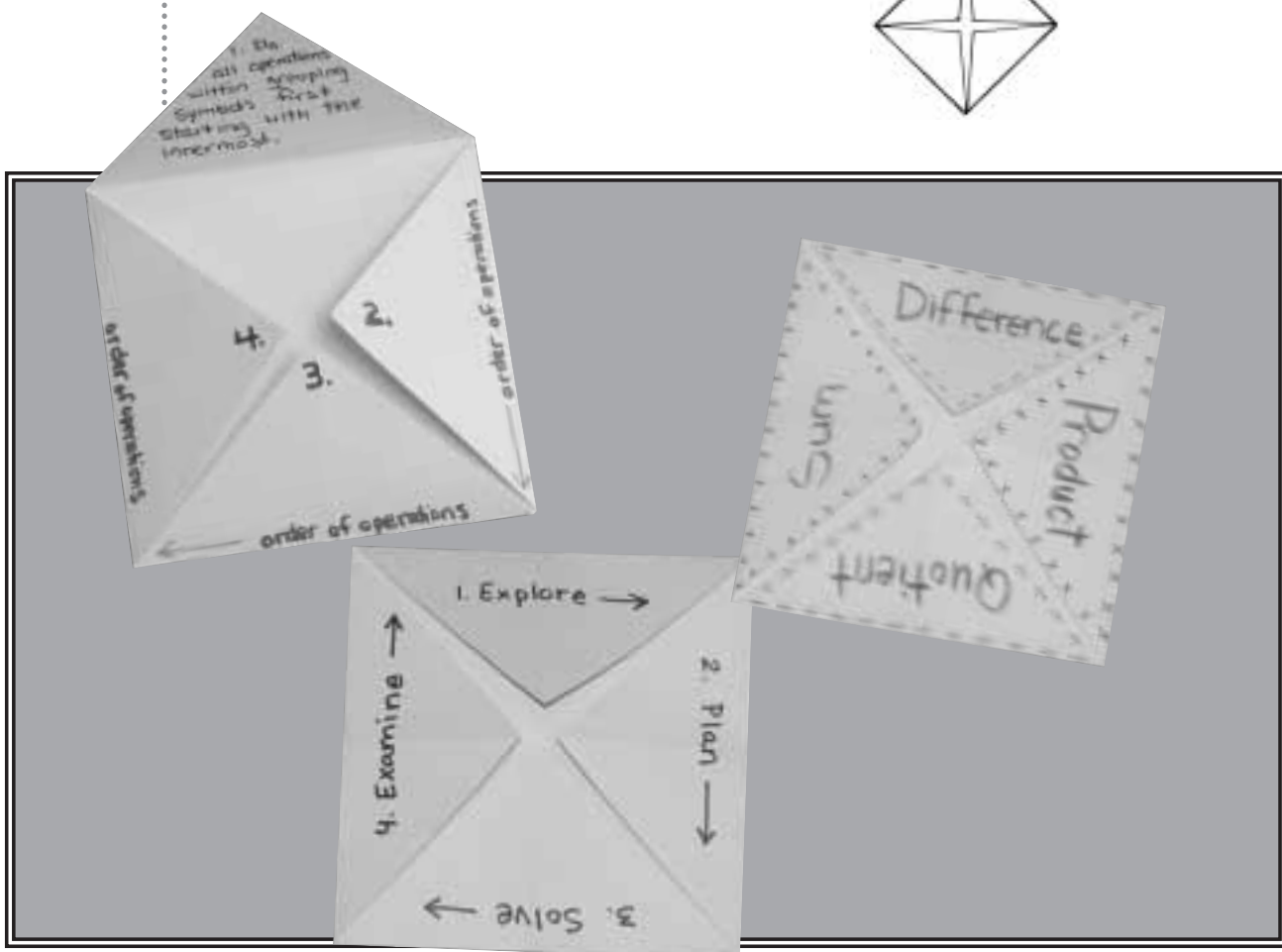
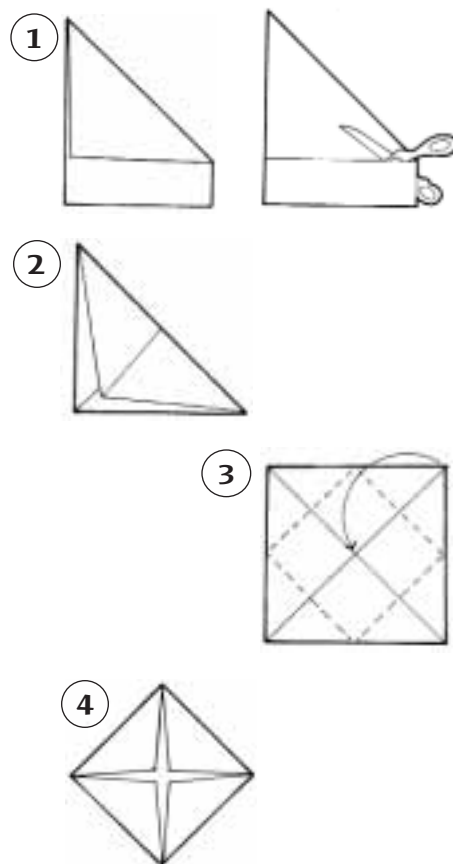
Use this book for data occurring in fours. For example: the four steps in the order of operations.



Envelope Fold

1. Fold a sheet of $8\frac{1}{2}'' \times 11''$ paper into a *taco* forming a square. Cut off the excess paper strip formed by the square.
2. Open the folded taco and refold it the opposite way forming another taco and an X fold pattern.
3. Open the *taco fold* and fold the corners toward the center point of the X forming a small square.
4. Trace this square on another sheet of paper. Cut and glue it to the inside of the envelope. Pictures can be placed under or on top of the tabs, or can be used to teach fractional parts.

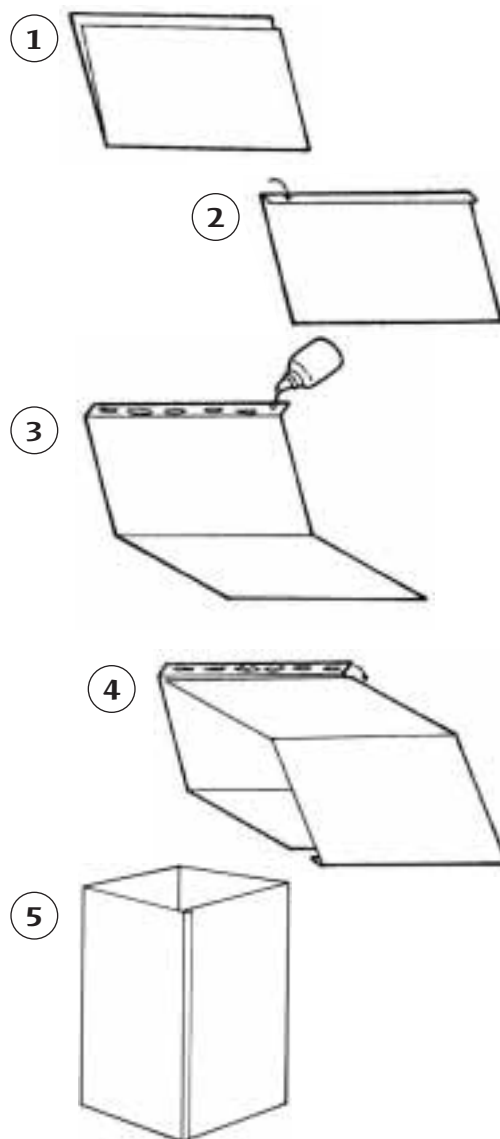
Use this book for data occurring in fours. For example, four operations.



Standing Cube

1. Use two sheets of the same size paper. Fold each like a *hamburger*. However, fold one side one half inch shorter than the other side. This will make a tab that extends out one half inch on one side.
2. Fold the long side over the short side of both sheets of paper, making tabs.
3. On one of the folded papers, place a small amount of glue along the the small folded tab, next to the *valley* but not in it.
4. Place the non-folded edge of the second sheet of paper square into the *valley* and fold the glue-covered tab over this sheet of paper. Press flat until the glue holds. Repeat with the other side.
5. Allow the glue to dry completely before continuing. After the glue has dried, the cube can be collapsed flat to allow students to work at their desks. The cube can also be folded into fourths for easier storage, or for moving it to a display area.

Use with data occurring in fours or make it into a project. Make a small display cube using $8\frac{1}{2}'' \times 11''$ paper. Use $11'' \times 17''$ paper to make large project cubes that you can glue other books onto for display. Notebook paper, photocopied sheets, magazine pictures, and current events also can be displayed on the large cube.

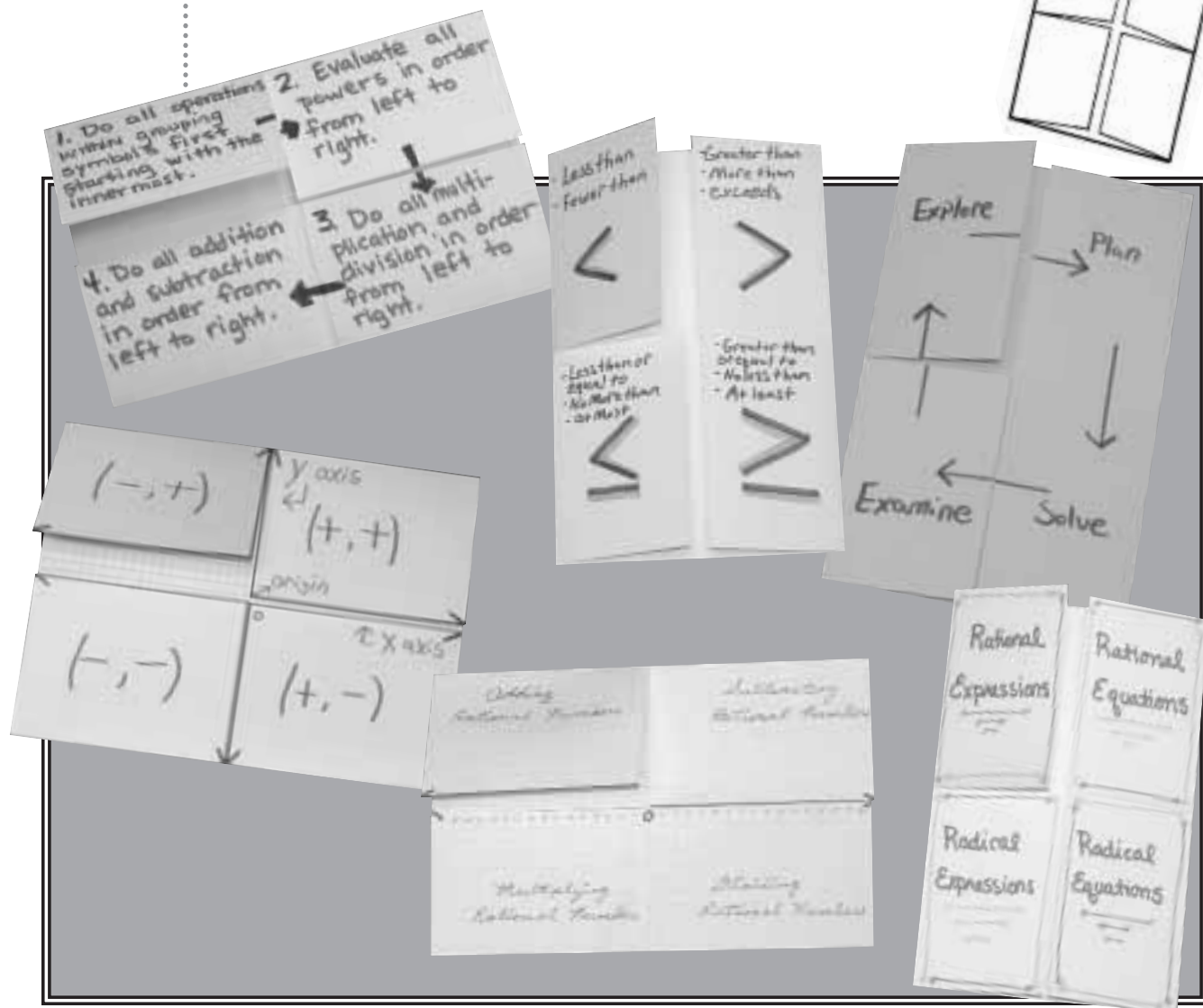
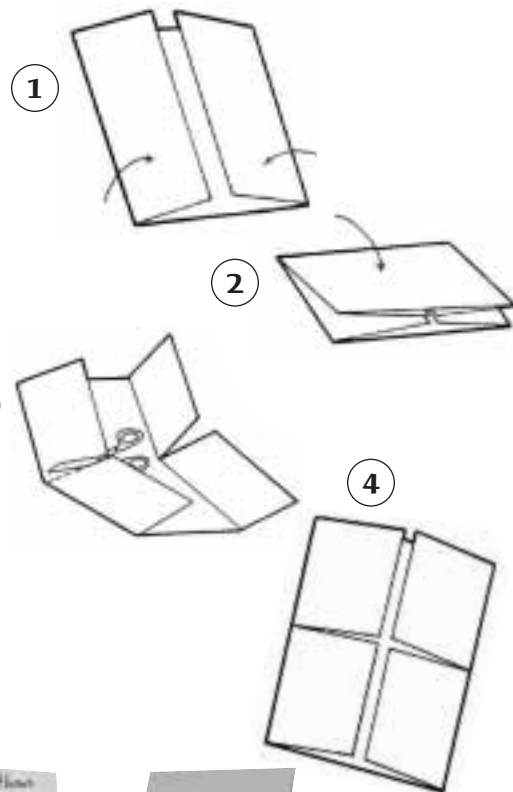


This large cube project can be stored in plastic bag portfolios.

Four-Door Book

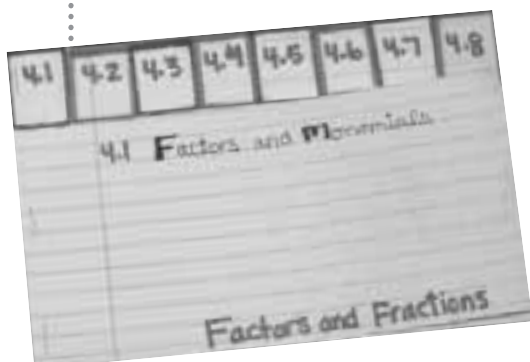
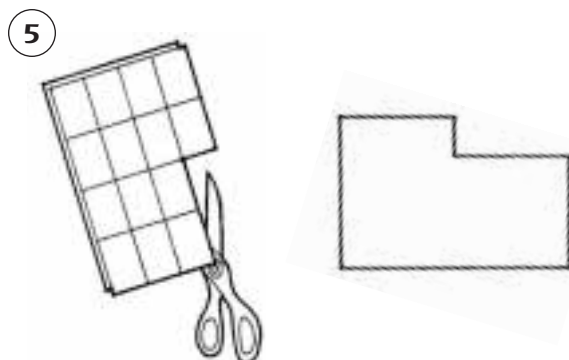
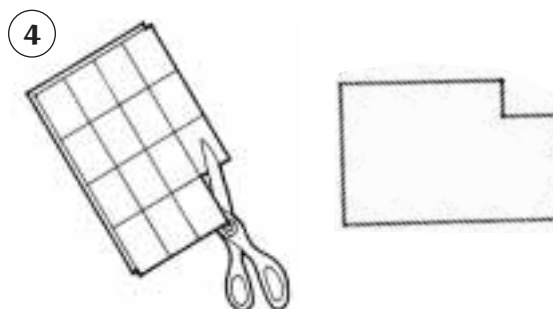
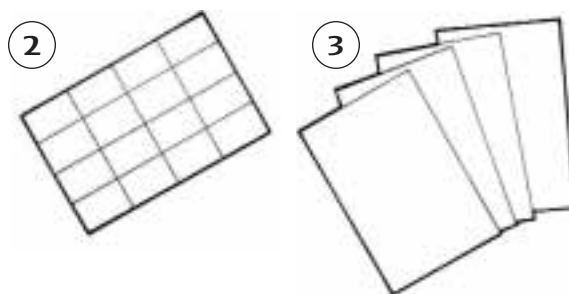
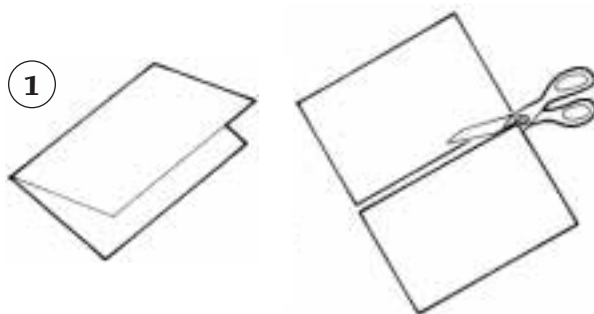
1. Make a *shutter fold* using $11" \times 17"$ or $12" \times 18"$ paper.
2. Fold the *shutter fold* in half like a *hamburger*. Crease well.
3. Open the project and cut along the two inside *valley folds*.
4. These cuts will form four doors on the inside of the project.

Use this fold for data occurring in fours. When folded in half like a *hamburger*, a finished *four-door book* can be glued inside a large ($11" \times 17"$) *shutter fold* as part of a larger project.

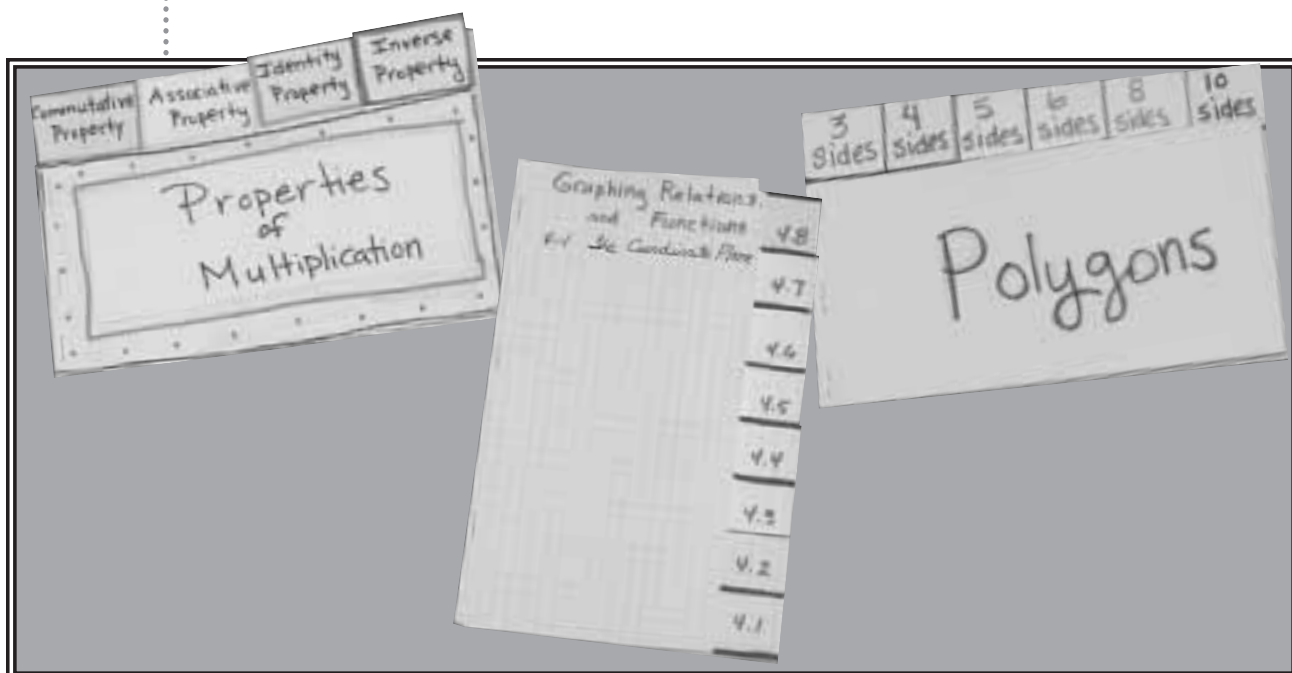
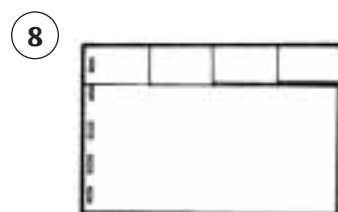
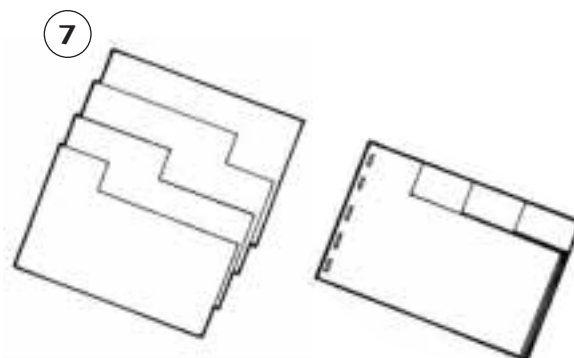
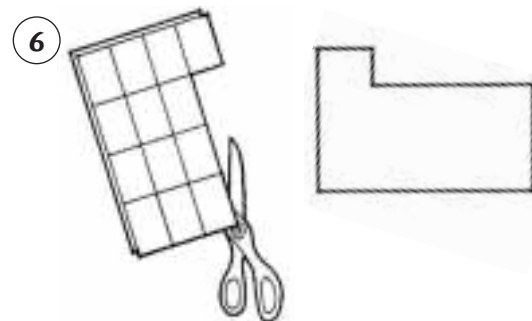


Top-Tab Book

1. Fold a sheet of $8\frac{1}{2}" \times 11"$ paper in half like a *hamburger*. Cut the center fold, forming two half sheets.
2. Fold one of the half sheets four times. Begin by folding in half like a *hamburger*, fold again like a *hamburger*, and finally again like a *hamburger*. This folding has formed your pattern of four rows and four columns, or 16 small squares.
3. Fold two sheets of $8\frac{1}{2}" \times 11"$ paper in half like a *hamburger*. Cut the center folds, forming four half sheets.
4. Hold the pattern vertically and place on a half sheet of paper under the pattern. Cut the bottom right hand square out of both sheets. Set this first page aside.
5. Take a second half sheet of paper and place it under the pattern. Cut the first and second right hand squares out of both sheets. Place the second page on top of the first page.



6. Take a third half sheet of paper and place it under the pattern. Cut the first, second, and third right hand squares out of both sheets. Place this third page on top of the second page.
7. Place the fourth, uncut half sheet of paper behind the three cut out sheets, leaving four aligned tabs across the top of the book. Staple several times on the left side. You can also place glue along the left paper edges, and stack them together. The glued spine is very strong.
8. Cut a final half sheet of paper with no tabs and staple along the left side to form a cover.



Accordion Book

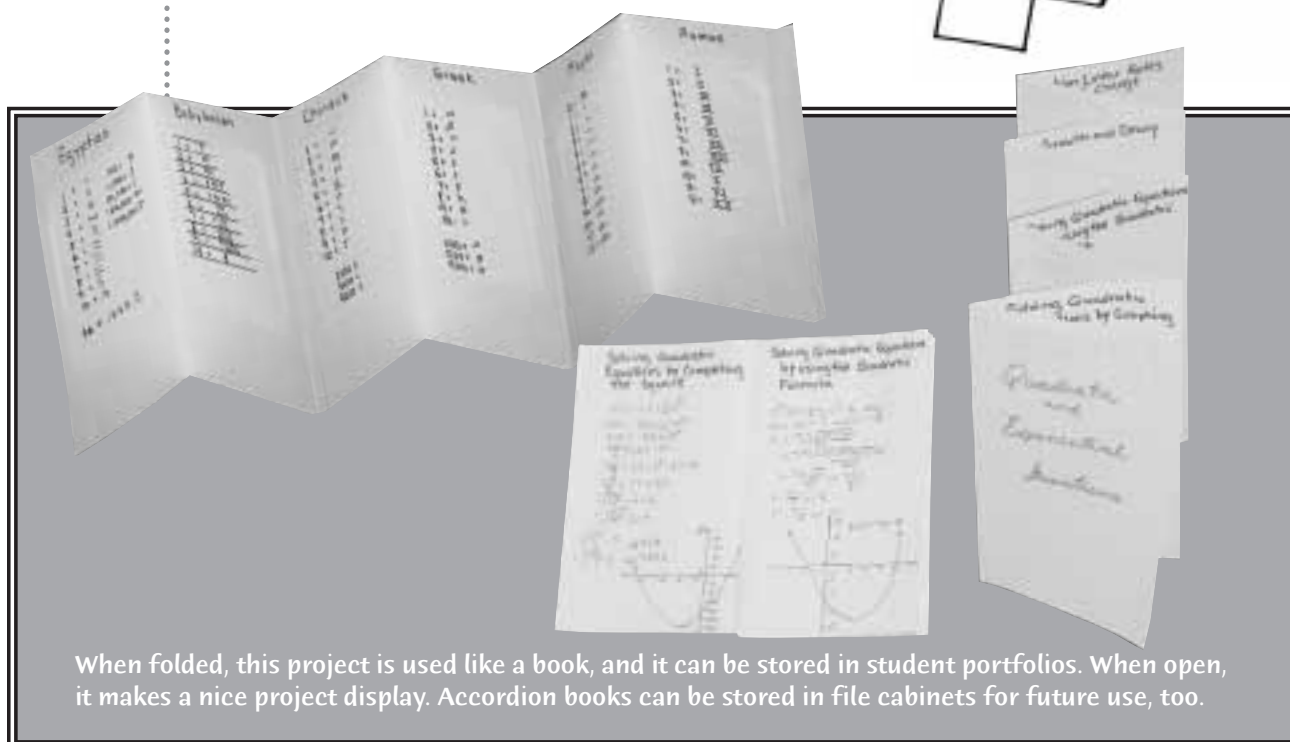
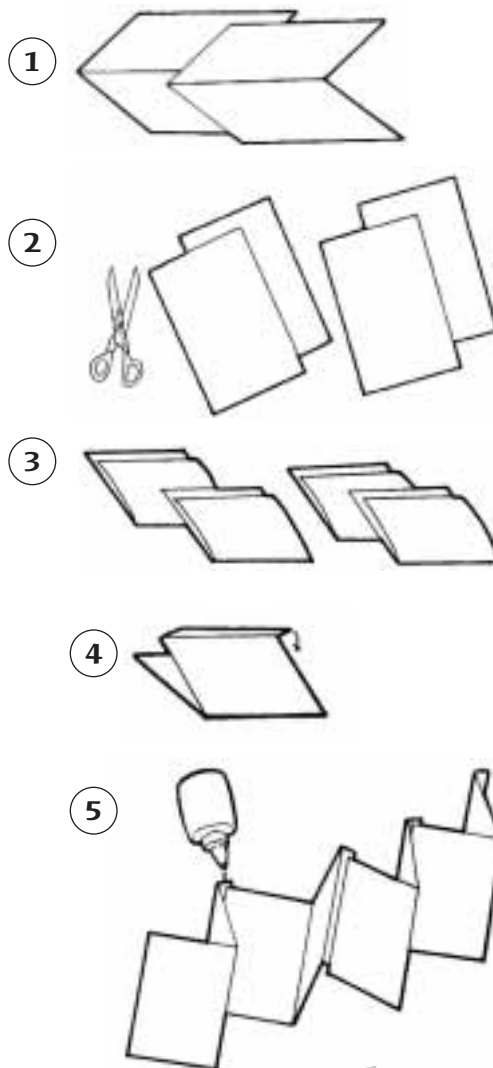
NOTE: Steps 1 and 2 should be done only if paper is too large to begin with.

1. Fold the selected paper into *hamburgers*.
2. Cut the paper in half along the fold lines.
3. Fold each section of paper into *hamburgers*. However, fold one side one half inch shorter than the other side. This will form a tab that is one half inch long.
4. Fold this tab forward over the shorter side, and then fold it back away from the shorter piece of paper. In other words, fold it the opposite way.
5. Glue together to form an *accordion* by gluing a straight edge of one section into the *valley* of another section.

NOTE: Stand the sections on end to form an accordion to help students visualize how to glue them together. (See illustration.)

Always place the extra tab at the back of the book so you can add more pages later.

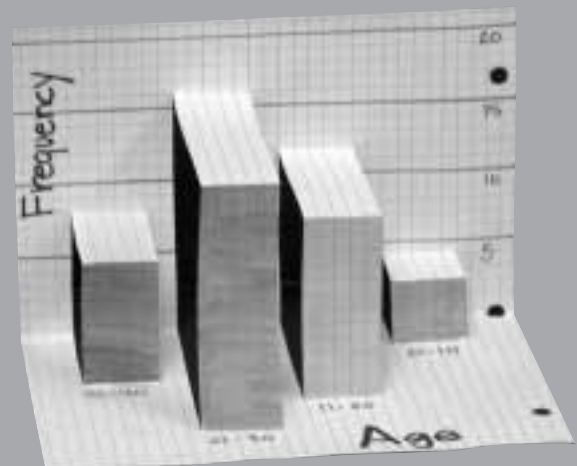
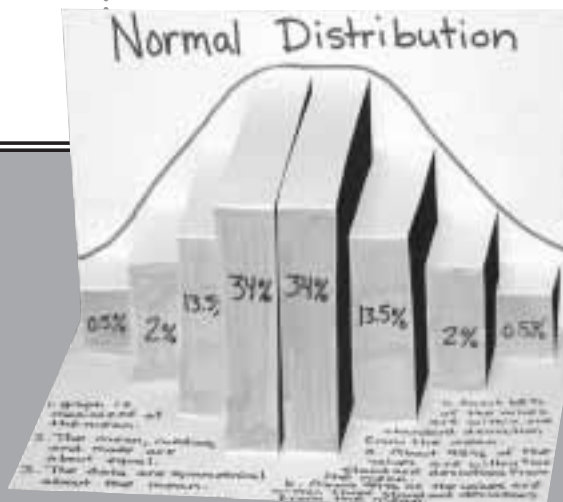
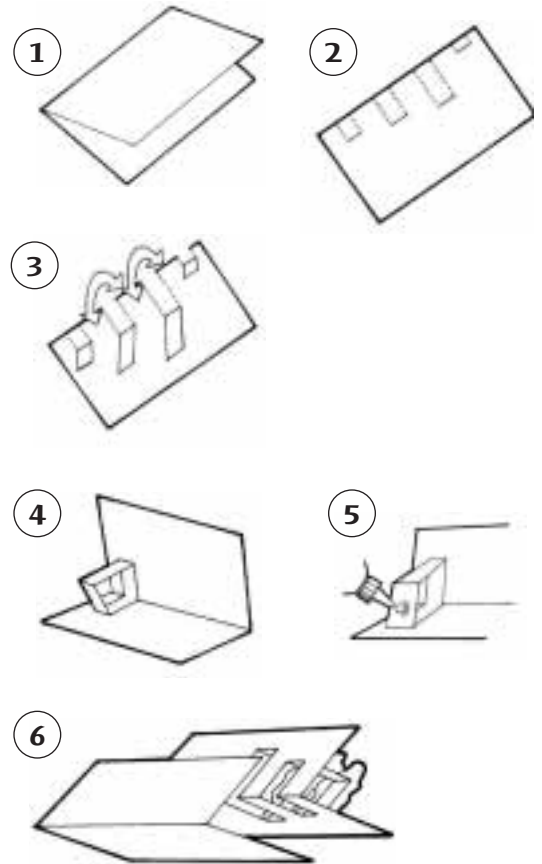
Use this book for number lines, timelines, student projects that grow, sequencing events or data, and more.



When folded, this project is used like a book, and it can be stored in student portfolios. When open, it makes a nice project display. Accordion books can be stored in file cabinets for future use, too.

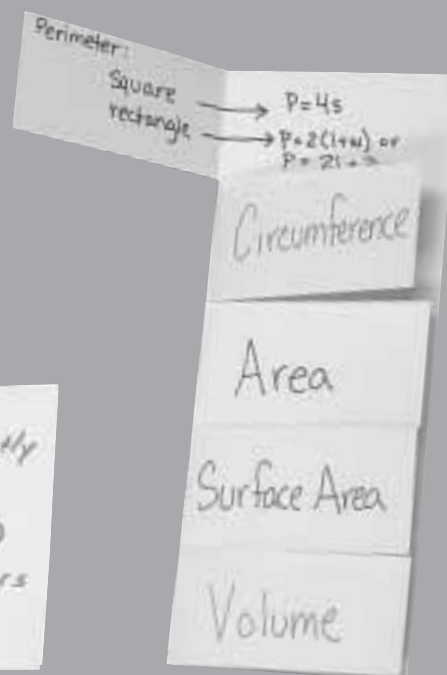
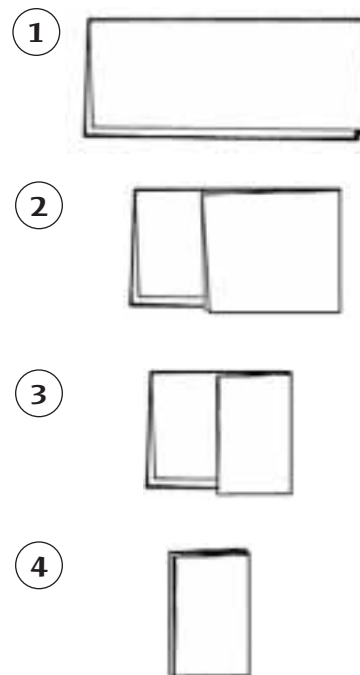
Pop-Up Book

1. Fold a sheet of $8\frac{1}{2}'' \times 11''$ paper in half like a *hamburger*.
2. Beginning at the fold, or *mountain* top, cut one or more tabs.
3. Fold the tabs back and forth several times until there is a good fold line formed.
4. Partially open the *hamburger* fold and push the tabs through to the inside.
5. With one small dot of glue, glue figures for the *pop-up book* to the front of each tab. Allow the glue to dry before going on to the next step.
6. Make a cover for the book by folding another sheet of paper in half like a *hamburger*. Place glue around the outside edges of the *pop-up book* and firmly press inside the *hamburger* cover.



Folding into Fifths

1. Fold a sheet of paper in half like a *hotdog* or *hamburger* for a five-tab book, or leave open for a folded table or chart.
2. Fold the paper so that one third is exposed and two thirds are covered.
3. Fold the two thirds section in half.
4. Fold the one third section backward to form fifths. The paper will be divided into fifths when opened.

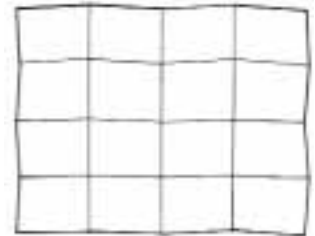


Folded Table, Chart, or Graph

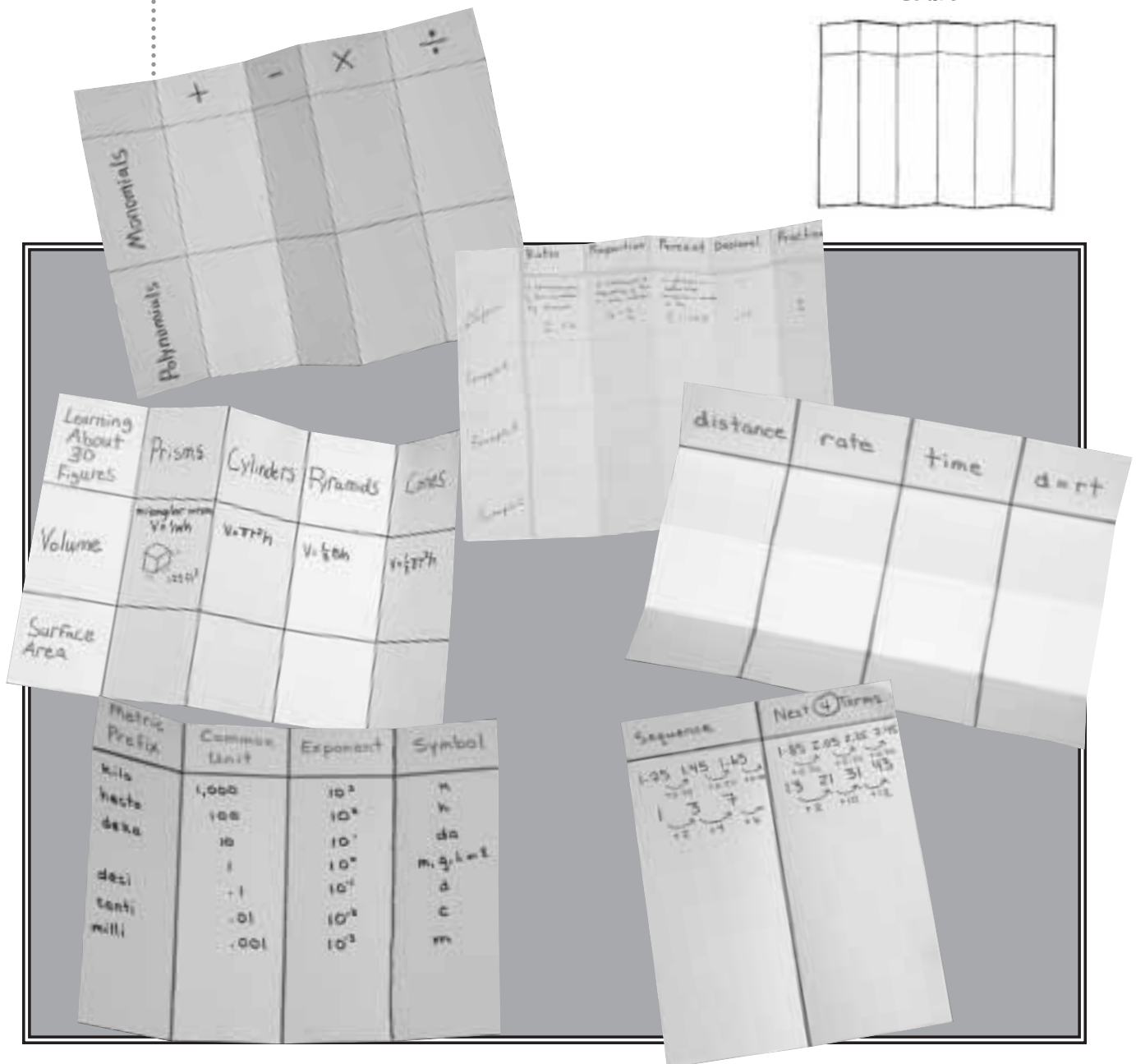
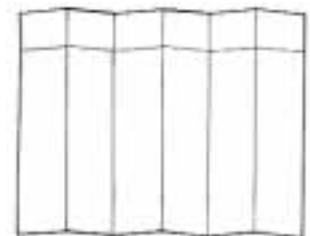
1. Fold the number of vertical columns needed to make the table or chart.
2. Fold the horizontal rows needed to make the table or chart.
3. Label the rows and columns.

Remember: Tables are organized along vertical and horizontal axes, while charts are organized along one axis, either horizontal or vertical.

Table

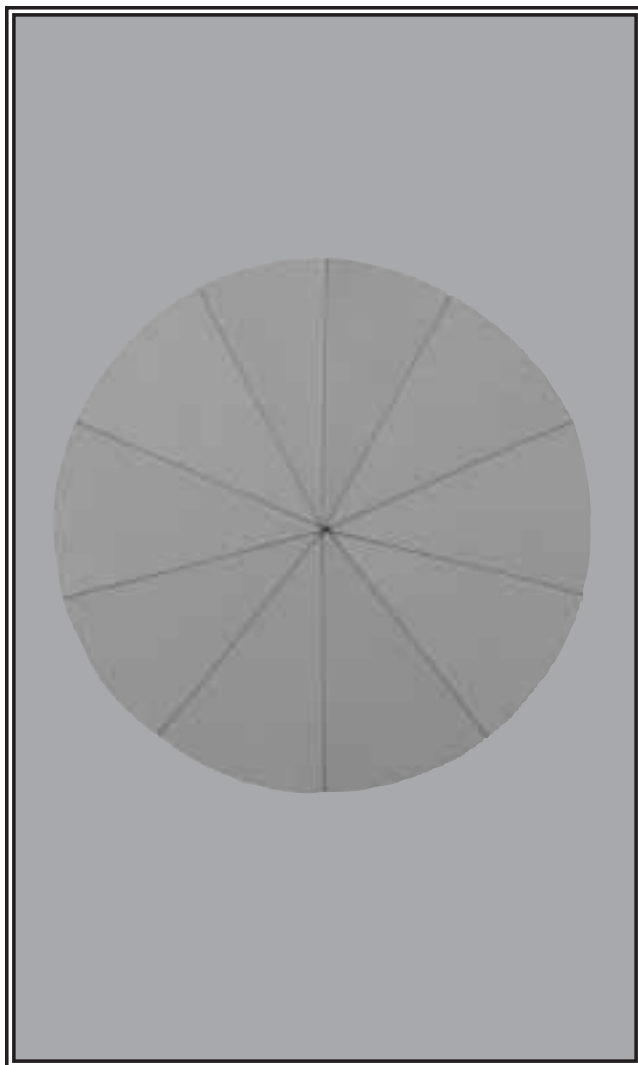
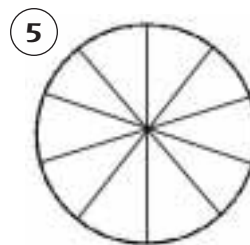
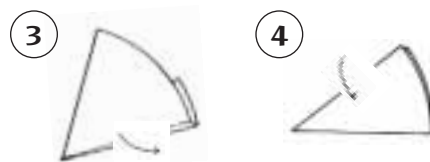
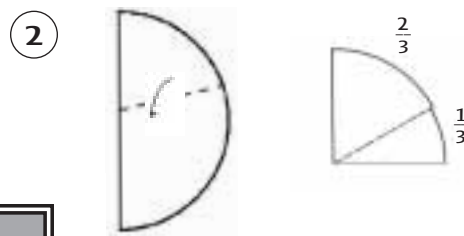
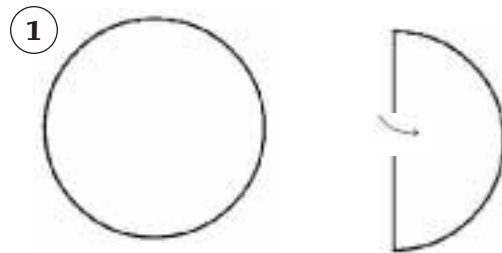


Chart



Folding a Circle into Tenths

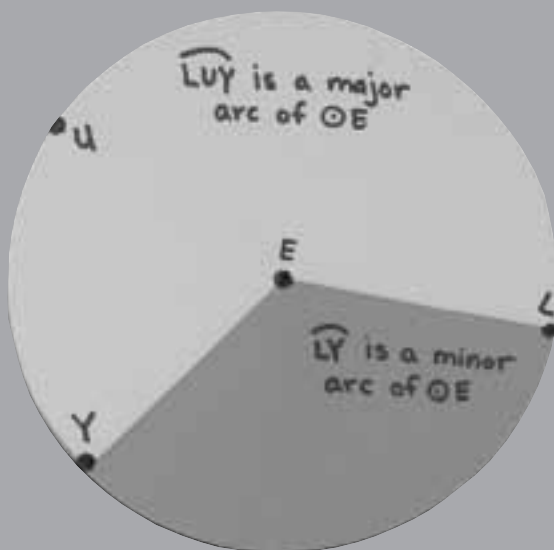
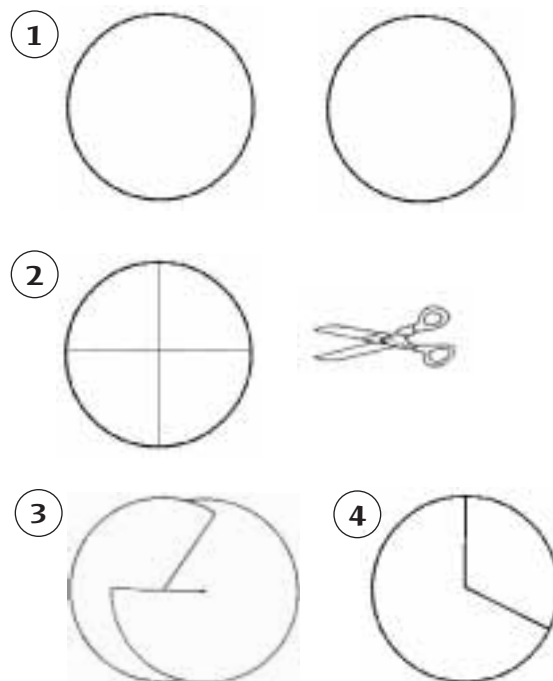
1. Fold a paper circle in half.
2. Fold the half circle so that one third is exposed and two thirds are covered.
3. Fold the one third (single thickness) backward to form a fold line.
4. Fold the two thirds section in half.
5. The half circle will be divided into fifths. When opened, the circle will be divided into tenths.



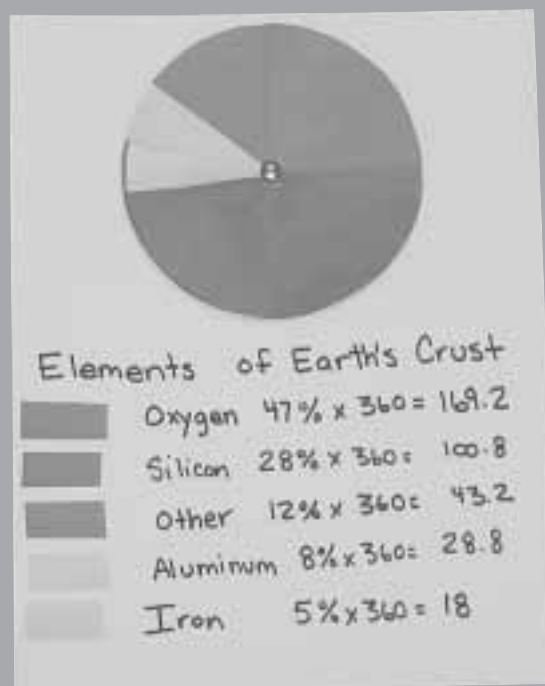
NOTE: Paper squares and rectangles are folded into tenths the same way. Fold them so that one third is exposed and two thirds is covered. Continue with steps 3 and 4.

Circle Graph

1. Cut out two circles using a pattern.
2. Fold one of the circles in half on each axis, forming fourths. Cut along one of the fold lines (the radius) to the middle of each circle. Flatten the circle.
3. Slip the two circles together along the cuts until they overlap completely.
4. Spin one of the circles while holding the other stationary. Estimate how much of each of the two (or you can add more) circles should be exposed to illustrate given percents or fractional parts of data. Add circles to represent more than two percents.



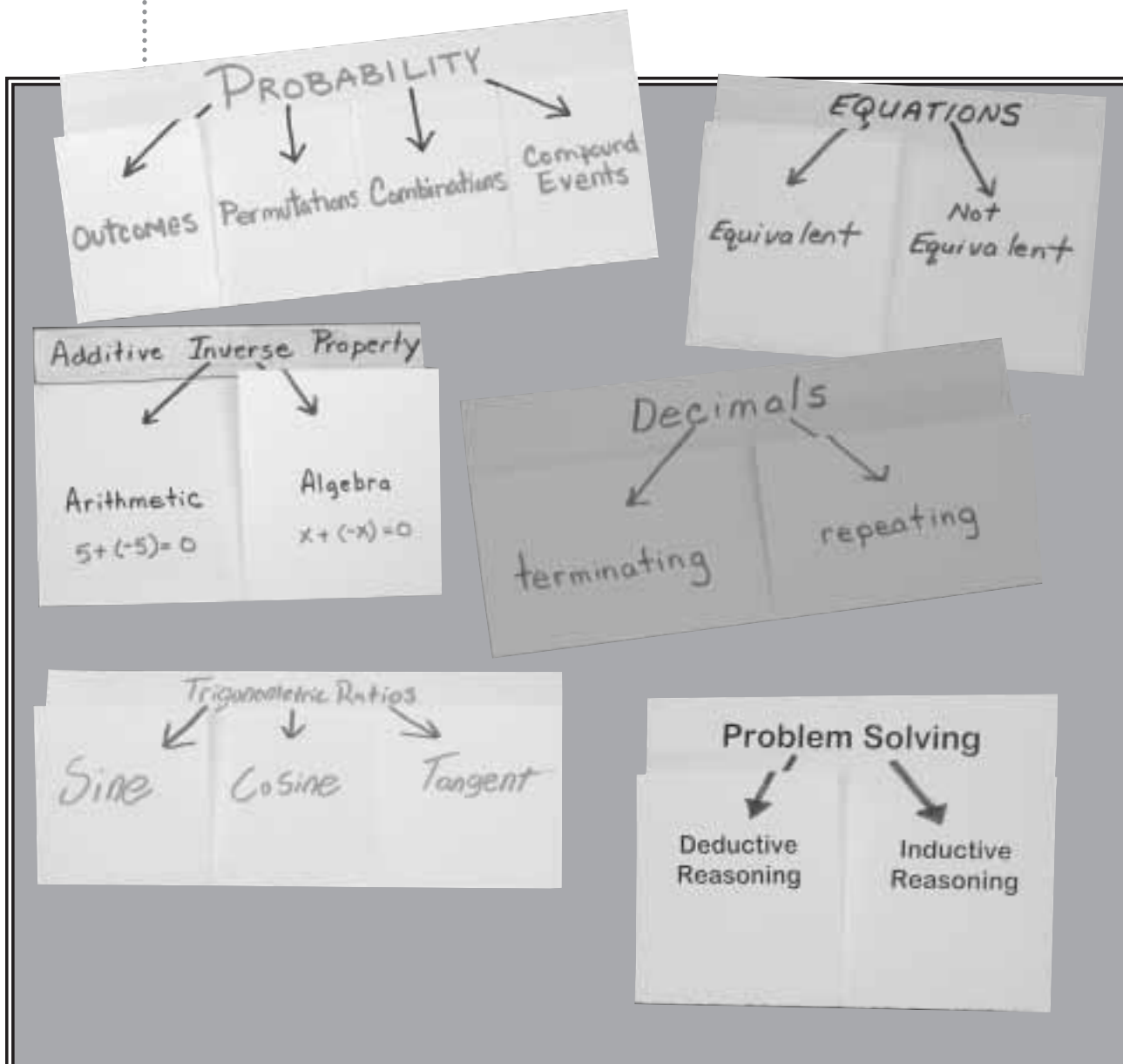
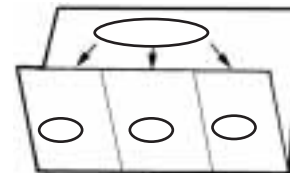
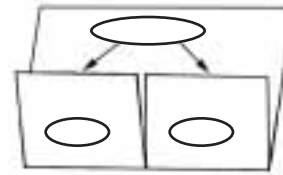
Use large circle graphs on bulletin boards.



Use small circle graphs in student projects or on the front of tab books.

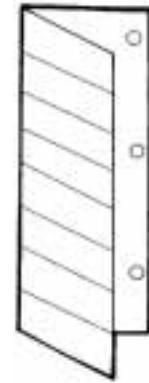
Concept-Map Book

1. Fold a sheet of paper along the long or short axis, leaving a two-inch tab uncovered along the top.
2. Fold in half or in thirds.
3. Unfold and cut along the two or three inside fold lines.



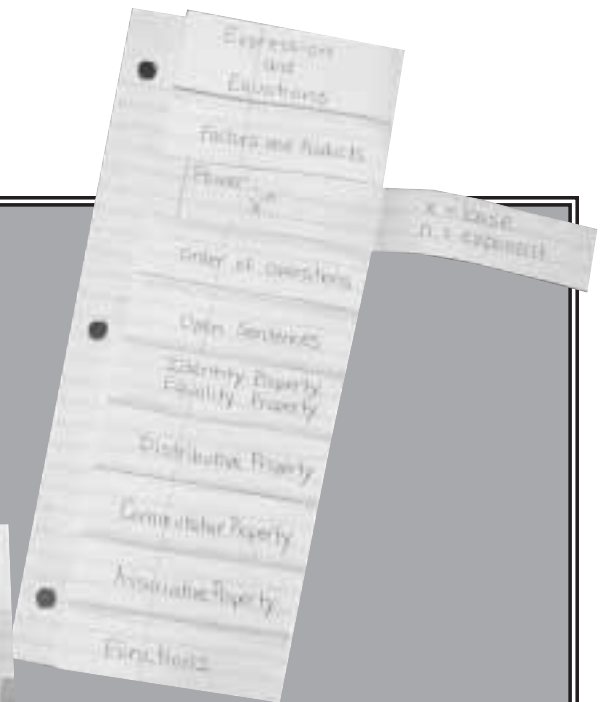
Vocabulary Book

1. Fold a sheet of notebook paper in half like a *hotdog*.
2. On one side, cut every third line. This usually results in ten tabs.
3. Label the tabs.



Use to take notes and record data.

Leave the notebook holes uncovered and the Foldable can be stored in a notebook.



Use for vocabulary books.

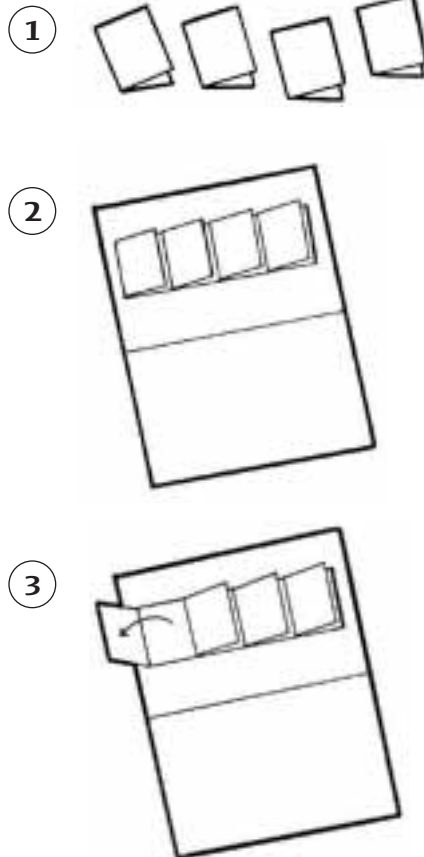


Use for recording student questions and answers.

Billboard Project

1. Fold all pieces of the same size of paper in half like *hamburgers*.
2. Place a line of glue at the top and bottom of one side of each folded billboard section and glue them edge-to-edge on a background paper or project board. If glued correctly, all doors will open from right to left.
3. Pictures, dates, words, etc., go on the front of each billboard section. When opened, writing or drawings can be seen on the inside left of each section. The base, or the part glued to the background, is perfect for more in-depth information or definitions.

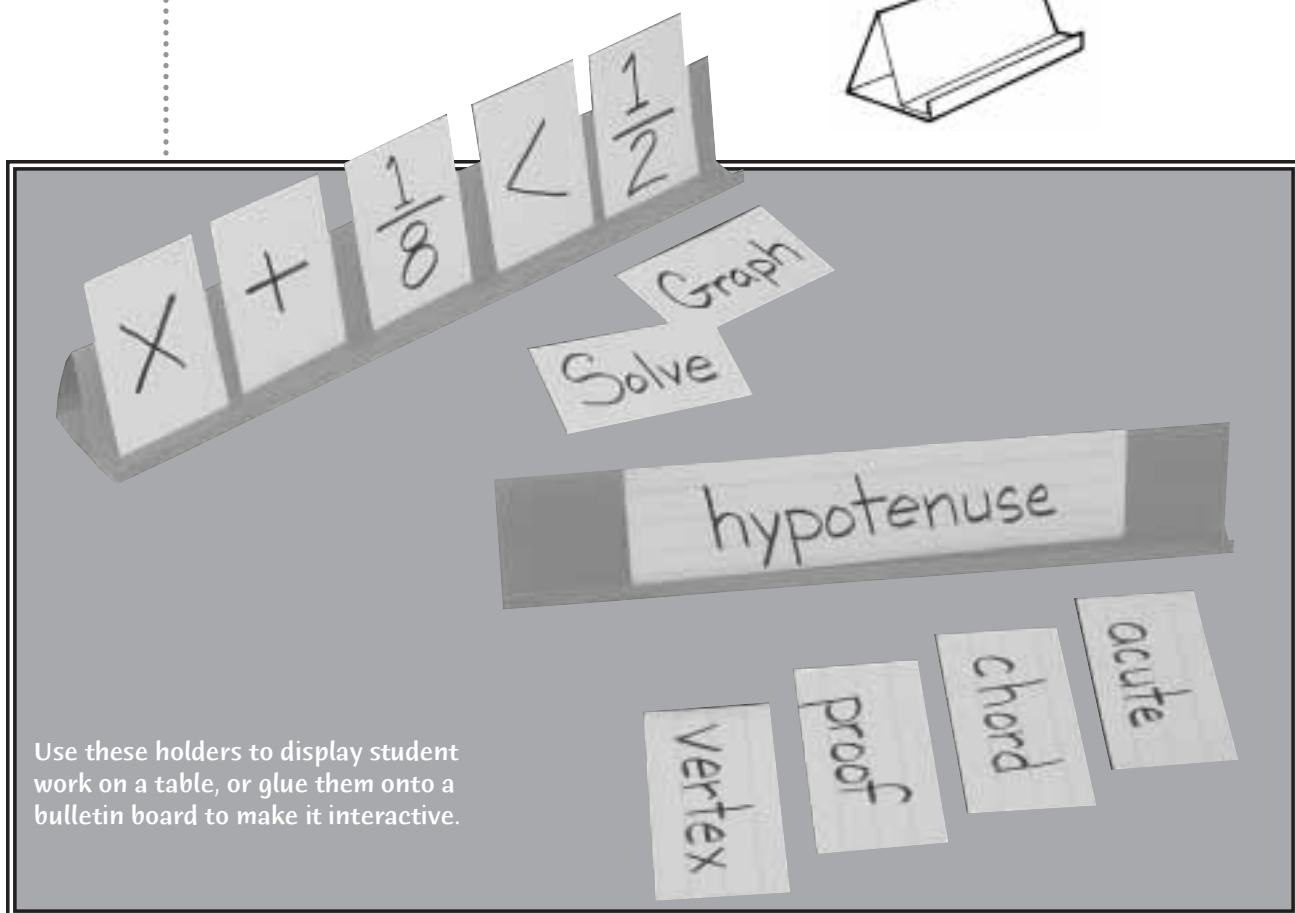
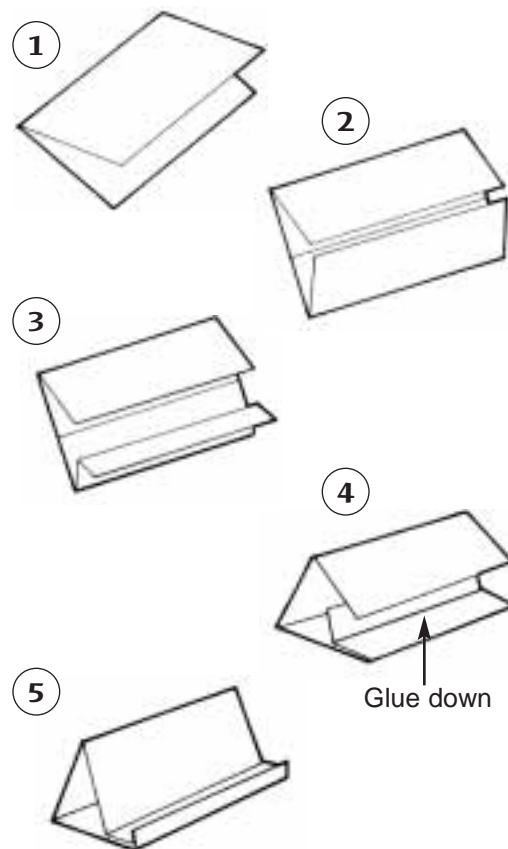
Use for timelines or sequencing data and number lines.



Sentence-Strip Holder

1. Fold a sheet of $8\frac{1}{2}'' \times 11''$ paper in half like a *hamburger*.
2. Open the *hamburger* and fold the two outer edges toward the *valley*. This forms a *shutter fold*.
3. Fold one of the inside edges of the shutter back to the outside fold. This fold forms a floppy "L".
4. Glue the floppy L-tab down to the base so that it forms a strong, straight L-tab.
5. Glue the other shutter side to the front of this L-tab. This forms a tent that is the backboard for the flashcards or student work to be displayed.

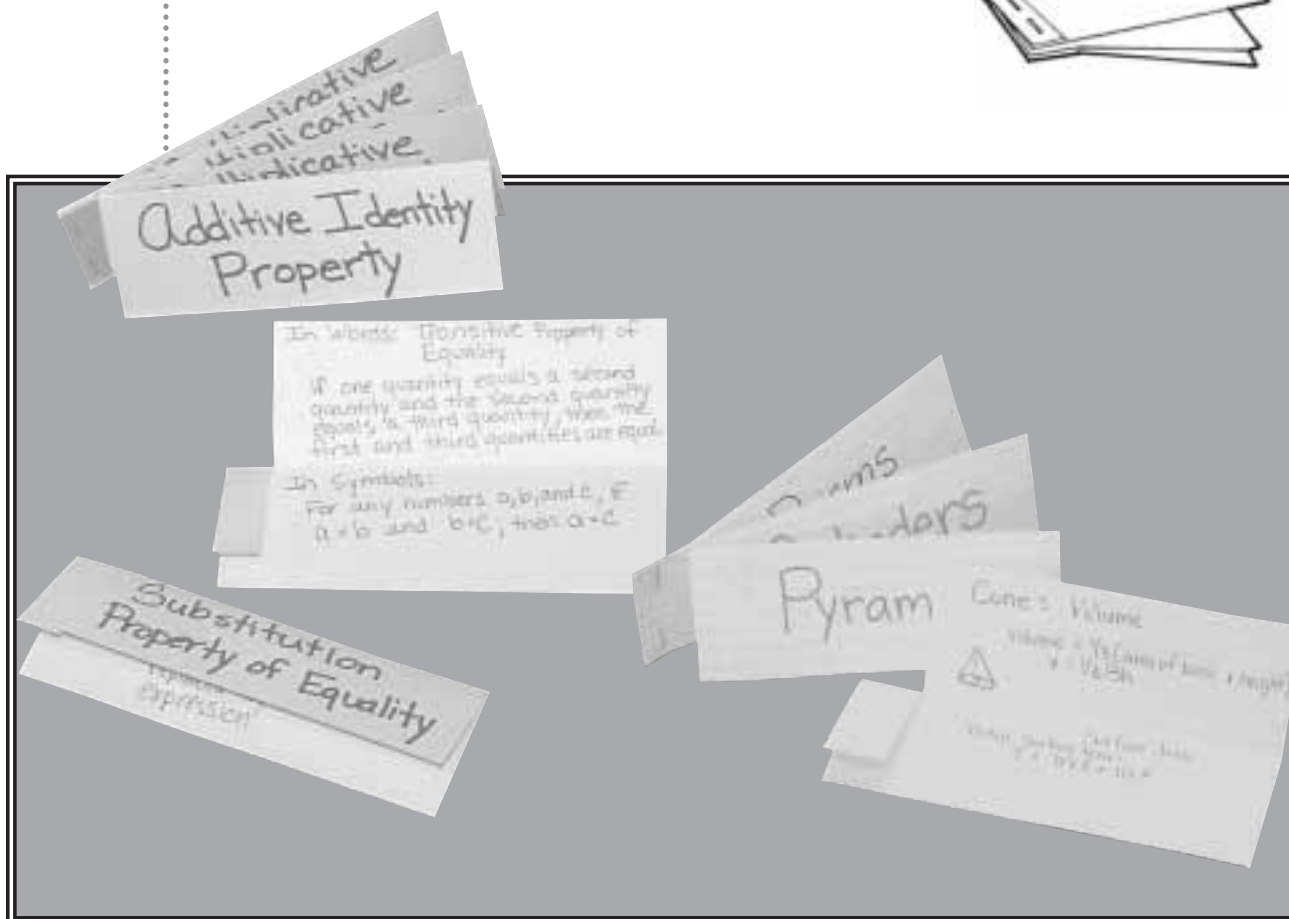
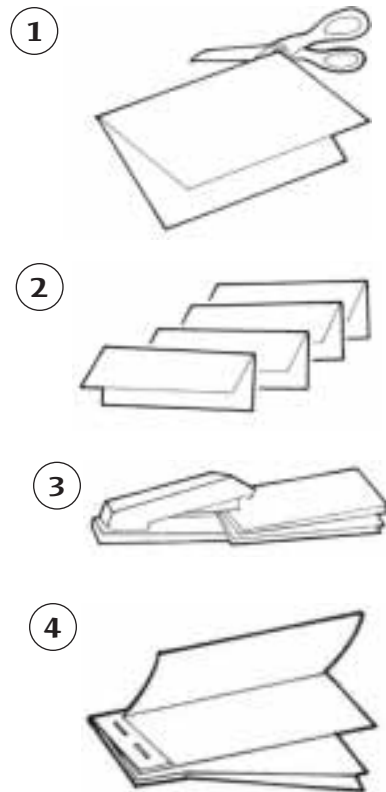
Fold the edge of the L-tab up one quarter to one half to form a lip that will keep the student work from slipping off the holder.



Sentence Strips

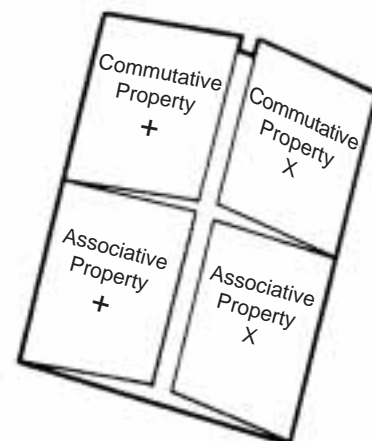
1. Take two sheets of $8\frac{1}{2}'' \times 11''$ paper and fold into *hamburgers*. Cut along the fold lines making four half sheets. (Use as many half sheets as necessary for additional pages to your book.)
2. Fold each sheet in half like a *hotdog*.
3. Place the folds side-by-side and staple them together on the left side.
4. One inch from the stapled edge, cut the front page of each folded section up to the mountain top. These cuts form flaps that can be raised or lowered.

To make a half-cover, use a sheet of construction paper one inch longer than the book. Glue the back of the last sheet to the construction paper strip leaving one inch, on the left side, to fold over and cover the original staples. Staple this half-cover in place.

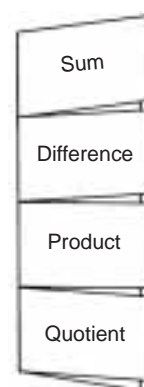


Whole Numbers

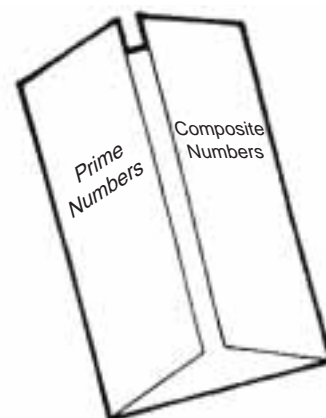
| Skill | Activity Suggestion | Foldable Parts |
|-----------------------|---|----------------|
| define | whole numbers as the counting numbers (0, 1, 2, 3. ...) and list examples | 2 |
| explain | why fractions such as $\frac{3}{3}$, $\frac{4}{4}$, and $\frac{8}{8}$ are whole numbers | 1 |
| find | 10 examples of equivalent whole numbers: $3, \frac{9}{3}$ | 10 |
| describe | the two basic operations that can be performed on whole numbers: addition (combines individual numbers) and multiplication (combines groups of numbers) subtraction and division as the inverse operations of addition and multiplication | 2 |
| explain and use | the Commutative Property of Addition and the Commutative Property of Multiplication. the Associative Property of Addition and the Associative Property of Multiplication | 4 |
| outline | the Distributive Property, also called the Distributive Property of Multiplication over Addition | 1 |
| differentiate between | the Commutative Property, Associative Property, and the Distributive Property | 3 |
| define | sum, difference, product, and quotient as they relate to whole numbers | 4 |
| determine | if subtraction and division are associative (neither are) and explain your answer | 2 |
| list and describe | the order in which operations should be performed: multiply and/or divide then add and/or subtract | 2 |
| compare and contrast | two types of whole numbers: primes and composites | 2 |
| note and | every whole number is either prime or composite explain except for 0 and 1 which are neither | 1 |
| give | examples of prime factors for six whole numbers | 6 |
| reduce | given fractions to see what whole number they represent: $\frac{12}{4}, \frac{18}{9}$ | any number |
| determine | whole numbers are greater than, less than, or equal to other whole numbers | 3 |
| round | whether five whole numbers to the nearest ten, nearest hundred, nearest thousand | 5 |
| demonstrate | three ways whole numbers can be written | 3 |
| use | whole numbers to solve real-world problems | any number |
| Venn diagram | characteristics of prime numbers, composite numbers, and both | 3 |



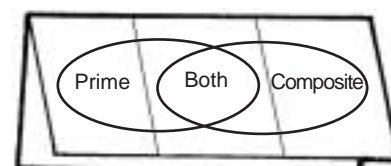
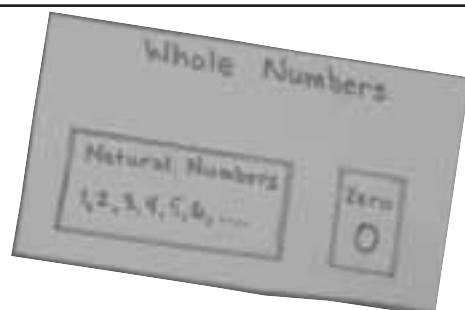
Four-Door Book



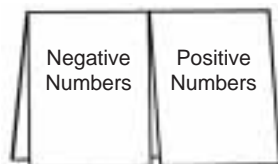
Four-Tab book



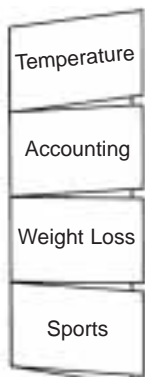
Shutter Fold



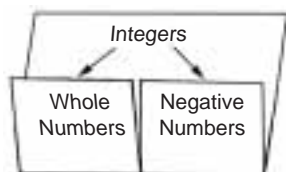
Three-Tab Venn diagram



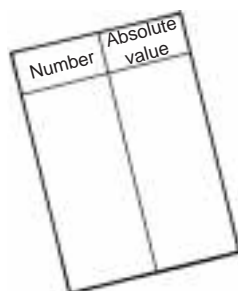
Two-Tab Book



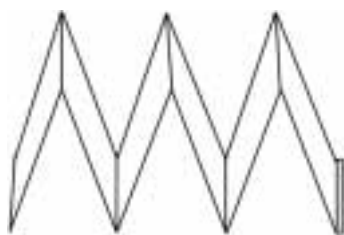
Four-Tab Book



Two-Tab Concept Map



Folded Chart



Number Line

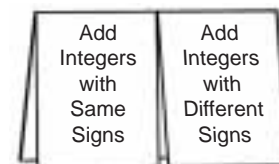
Integers

| Skill | Activity Suggestion | Foldable Parts |
|-----------------------|---|----------------|
| define | integers as the set of whole numbers and their opposites, or negative numbers (... -3, -2, -1, 0, 1, 2, 3...) | 1 |
| differentiate between | positive and negative numbers | 2 |
| list | examples of positive and negative integers | 2 |
| explain | in your own words why you think zero is neither positive nor negative, but part of the set of integers | 1 |
| show | how the set of integers might be written {... -3, -2, -1, 0, 1, 2, 3, ...} and explain the use of ellipses | 2 |
| describe | four examples of the use of negative numbers in the real world: temperature, balancing account books, reporting weight loss, distance lost in a game or sport | 4 |
| define | absolute value as the number of units a number is from 0 on a number line | 1 |
| write | the definition of absolute value in words and symbols | 2 |
| find | the absolute value of given expressions | any number |
| explain | why absolute value can never be less than 0 | 1 |
| describe | absolute value in terms of distance and give examples | 2 |
| graph | given integers on a number line | any number |
| | two points on a number line so that the coordinates of both have an absolute value of a given number | any number |
| write | inequalities using integers | any number |
| sequence | given integers from greatest to least, or from least to greatest | any number |
| state | which integers have the greater absolute value | any number |
| describe | how to determine if one integer is less than or greater than another integer | 2 |
| design | a concept map that shows integers as the union of whole numbers and their opposites | 2 |
| make | a number line for whole numbers and integers | 1 |

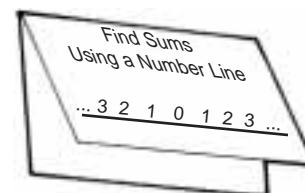


Integers: Adding and Subtracting

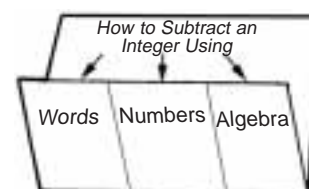
| Skill | Activity Suggestion | Foldable Parts |
|----------------------|---|----------------|
| describe | how to add integers with the same sign | 1 |
| use | a number line and show how to add integers with the same sign | 2 |
| explain | how to add integers with different signs | 1 |
| use | a number line and show how to add integers with different signs | any number |
| compare and contrast | adding integers with the same and different signs | 2 |
| draw | a model that shows how to find the sum of two integers on a number line and describe your model | 2 |
| explain | how adding and subtracting are inverse operations that “undo” each other | 2 |
| use | a number line to show what happens when you add opposites like -9 and 9 | any number |
| define | an integer and its opposite as additive inverses of each other | 1 |
| describe | additive inverse in words, numerically, and algebraically | 3 |
| explain | how to subtract integers using what you know about additive inverses | 1 |
| describe | how to subtract an integer in words, numerically, and algebraically | 3 |
| draw | a model that shows how to find $7 - (-2)$ | 1 |
| simplify | expressions such as $15x - 18x$ | any number |



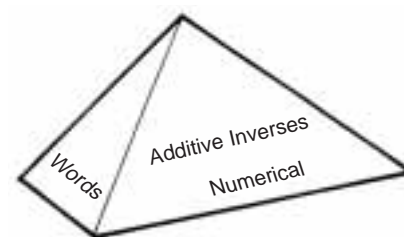
Two-Tab Book



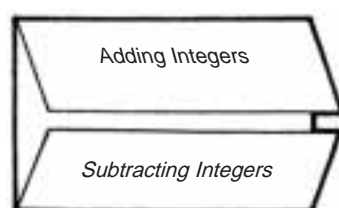
Half Book



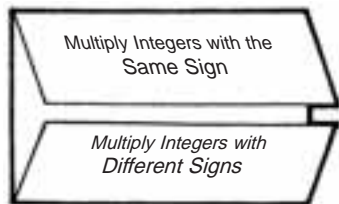
Three-Tab Concept Map



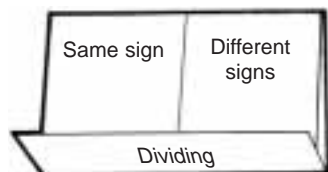
Pyramid Fold



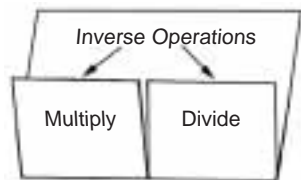
Shutter Fold



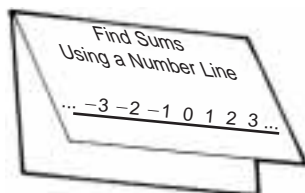
Shutter Fold



Matchbook



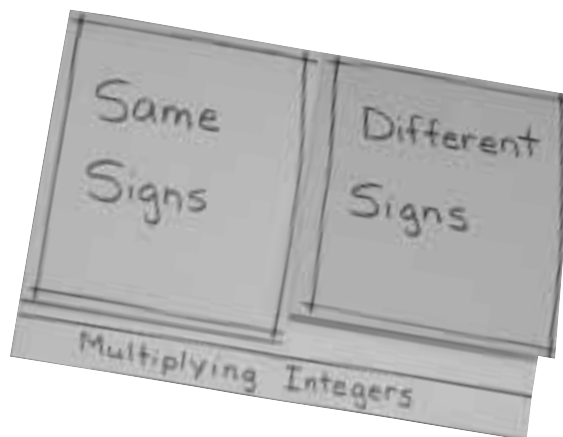
Two-Tab Concept Map



Half Book

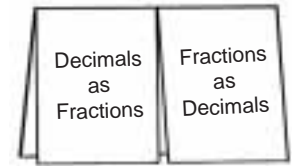
Integers: Multiplying and Dividing

| Skill | Activity Suggestion | Foldable Parts |
|----------------------|---|----------------|
| describe | how to multiply integers with the same sign | 1 |
| use | a number line to show and explain how to multiply integers with the same sign | any number |
| explain | how to multiply integers with different signs | 1 |
| use | a number line to show and explain how to multiply integers with different signs | 2 |
| compare and contrast | multiplying integers with the same and different signs | 2 |
| draw | a model that shows how to find the product of two integers on a number line and write about the process | 2 |
| review | how multiplying and dividing are inverse operations that “undo” each other | 2 |
| explain | how to divide integers with the same sign | 1 |
| demonstrate | how to divide integers with different signs | 1 |
| describe | how to divide integers with the same and different signs in words, numerically, and algebraically | 3 |
| find | similarities and differences between multiplying and dividing integers with the same signs and multiplying and dividing integers with different signs | 4 |

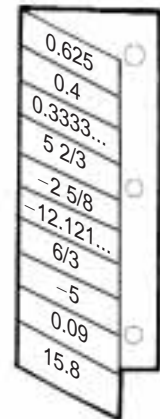


Rational Numbers

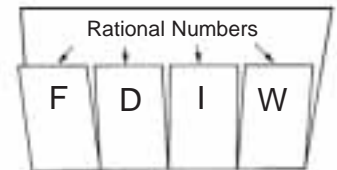
| Skill | Activity Suggestion | Foldable Parts |
|----------|--|----------------|
| define | rational numbers as numbers that can be written as a ratio, or fraction where a and b are integers and b is not equal to 0 | 1 |
| explain | why whole numbers, integers, fractions, mixed numbers, terminating decimals, and repeating decimals are rational numbers | 6 |
| chart | and list examples of whole numbers, integers, fractions, terminating decimals, and repeating decimals | 5 |
| document | five rational numbers encountered in a day | 5 |
| rename | 10 rational numbers | 10 |
| write | decimals as fractions and fractions as decimals | 2 |
| solve | equations using rational numbers | any number |
| design | a concept map for rational numbers. rational numbers: fractions, repeating and terminating decimals, integers, and whole numbers | 5 |
| estimate | sums of rational numbers | any number |
| find | sums of rational numbers | any number |
| solve | equations involving rational numbers | any number |
| | inequalities involving rational numbers | any number |
| explain | how adding and subtracting rational numbers follow the same principles as adding and subtracting integers | 2 |
| use | rational numbers to write three examples of the Commutative Property | 3 |
| | rational numbers to write three examples of the Associative Property | 3 |
| | rational numbers to write three examples of the Identity Property | 3 |
| | rational numbers to write three examples of the Inverse Property | 3 |



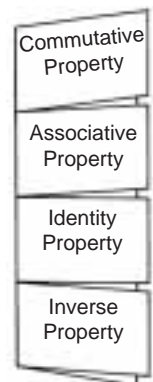
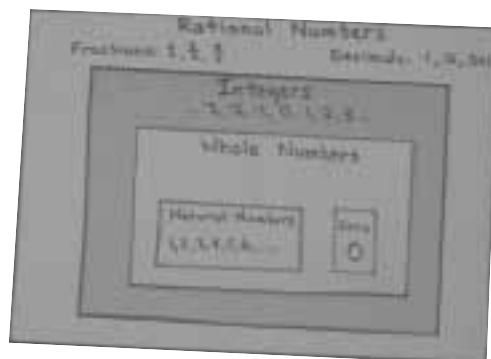
Two-Tab Book



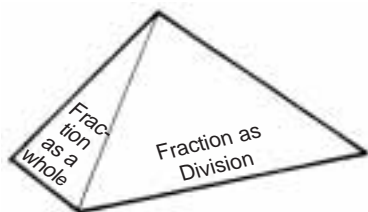
Vocabulary Book



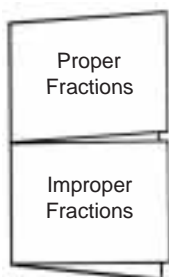
Concept Map



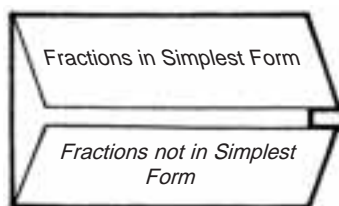
Four-Tab Book



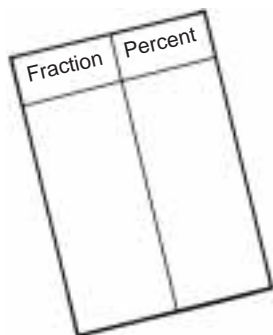
Pyramid Fold



Two-Tab Book



Shutter Fold



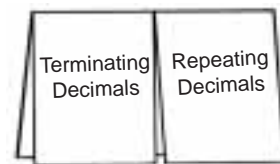
Folded Chart

Rational Numbers: Fractions

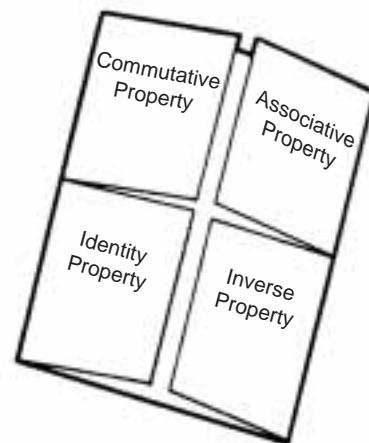
| Skill | Activity Suggestion | Foldable Parts |
|-----------------------|---|----------------|
| define | fractions three ways: as part of a whole as multiplication ($\frac{3}{5}$ means 3 times $\frac{1}{5}$) as division ($\frac{3}{5}$ means 3 divided by 5) | 3 |
| differentiate between | proper and improper fractions | 2 |
| rename | whole numbers as improper fractions with a given denominator | 2 |
| order | ten fractions from least to greatest | 10 |
| graph | five fractions on a number line | 5 |
| use | a number line to determine if fractions are equivalent | any number |
| express | six ratios as fractions in simplest form | 6 |
| determine | if five fractions are in their simplest form by checking to see if the GCF of the numerator and the denominator is 1 | 5 |
| list | examples of fractions in simplest form and fractions that are not in simplest form | any number |
| explain | why it is easier to compare fractions with the same denominator | 1 |
| describe | how the least common denominator of fractions could be used to compare them | 1 |
| define | a mixed number as the sum of a whole number and a fraction | 1 |
| write | mixed numbers as improper fractions and improper fractions as mixed numbers | 2 |
| compare | fractions and decimals | 2 |
| chart | equivalent fractions and decimals | 2 |
| Venn diagram | given specific examples, compare characteristics of like fractions, unlike fractions, and both | 3 |
| explain | how to add like and unlike fractions in words and symbols | 4 |
| add | fractions with like and unlike denominators | 2 |
| subtract | fractions with like and unlike denominators | 2 |
| explain | how to subtract fractions with like and unlike denominators | 2 |
| compare and contrast | adding and subtracting unlike fractions | 2 |
| multiply | fractions with like and unlike denominators | 2 |
| explain | how to multiply fractions with like and unlike denominators in words and symbols | 4 |
| divide | fractions with like and unlike denominators | 2 |
| prove | that dividing by 2 is the same as multiplying by $\frac{1}{2}$, its multiplicative inverse | 2 |
| write | word problems that contain fractions | any number |
| express | given fractions as percents | 2 |
| tell | how you know if a fraction is greater than 100% or less than 1% | 1 |
| compare and contrast | a fraction and an algebraic fraction | 2 |
| write | six algebraic fractions in simplest form | 6 |

Rational Numbers: Decimals

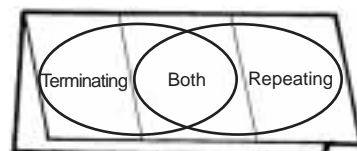
| Skill | Activity Suggestion | Foldable Parts |
|----------------------|---|----------------|
| order | ten decimals from least to greatest | 10 |
| rename | five decimals as fractions | 5 |
| explain | why decimals can be written as fractions with denominators that are powers of ten | 1 |
| find | equivalent decimals and fractions | 2 |
| differentiate | between terminating decimals, repeating decimals, and decimals that do not terminate nor repeat | 3 |
| compare and contrast | terminating and repeating decimals | 2 |
| find | examples of decimals that do not terminate or repeat | any number |
| write | four fractions as terminating or repeating decimals | 4 |
| define | terminating decimals | 1 |
| describe | repeating decimals | 1 |
| Venn diagram | characteristics of terminating decimals, repeating decimals, both | 3 |
| estimate | sums of six decimals using rounding and describe each | 6 |
| find | six sums of decimals and describe the process | 6 |
| estimate | six differences of decimals and write about the process | 6 |
| find | six differences of decimals and explain the process | any number |
| state | additive inverses of five decimals example: 8.45 and -8.45 | 5 |
| illustrate | the rule for placement of the decimal point when multiplying decimals | 1 |
| explain | in your own words how to divide by a decimal | 1 |
| simplify | four expressions with decimals and explain each step | 4 |
| evaluate | five expressions with decimals and explain each step | 5 |



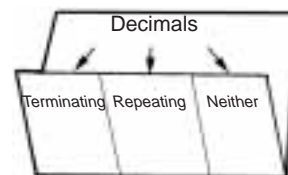
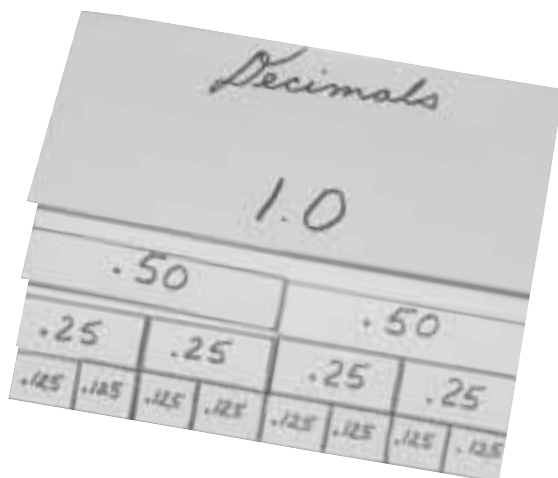
Two-Tab Book



Four-Door Book

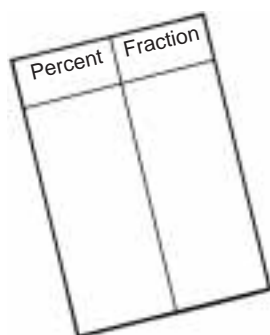


Three-Tab Venn Diagram

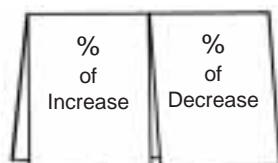


Three-Tab Concept Map

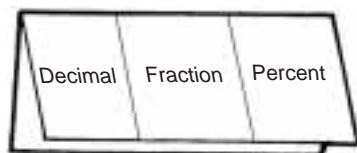
Percents



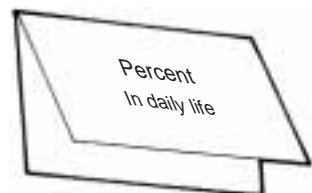
Folded Chart



Two-Tab Book



Three-Tab Book



Half Book



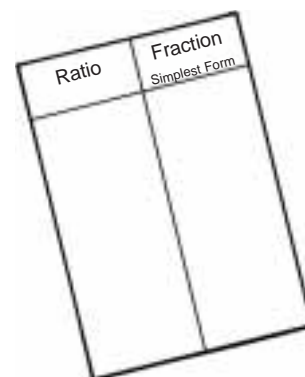
Bound Book

| Skill | Activity Suggestion | Foldable Parts |
|---------------|--|----------------|
| define | percent as a ratio that compares a number to 100 or tells how many out of 100 | 1 |
| explain | why percent also means hundredths, or per hundred | 1 |
| write | five percents as fractions and explain | 5 |
| use | the percent symbol when writing percents | any number |
| | equations to solve problems with percents | any number |
| make a table | that expresses decimals and fractions as percents | 3 |
| | that expresses percents as decimals and fractions | 3 |
| describe | times when it is more advantageous to use percent and times when it is more advantageous to use fractions | 2 |
| use | the percent proportion to write five fractions as percents | 5 |
| solve | six problems involving percents | 6 |
| find | the percent proportion of four numbers and explain Example: find 10% of 160 | 4 |
| estimate | three percents and outline the process | 3 |
| solve | two percent problems with percent equations and sequence the steps | 2 |
| | two real-world problems involving percent | 2 |
| write | expressions for percents | any number |
| use | percents to estimate | any number |
| explain | how to estimate $x\%$ of a number | 1 |
| list | five examples of percents used in everyday life such as weather bureau's rain prediction, interest rates, discounts, and commissions and explain their use | 5 |
| describe | percent of change as the ratio of the amount of change to the original amount | 1 |
| differentiate | between percent of increase and percent of decrease | 2 |
| calculate | percent of increase and percent of decrease | 2 |

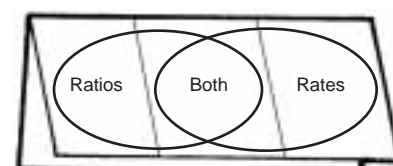
| Decimals | Fractions | Percents |
|----------|---------------|----------|
| .25 | $\frac{1}{4}$ | → 25% |
| .75 | $\frac{3}{4}$ | → 75% |

Ratios

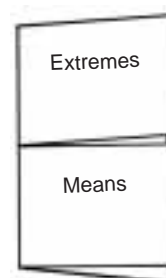
| Skill | Activity Suggestion | Foldable Parts |
|--------------------------|---|----------------|
| define | ratio as a comparison of two numbers by division | 1 |
| write | four ratios four different ways Example: 2 to 3, 2:3, $\frac{2}{3}$, and $2 \div 3$ | 4 |
| | five ratios as fractions in simplest form | 5 |
| | expressions for five ratios | 5 |
| describe | rate as a ratio that is a comparison of two measurements with different units of measurement | 1 |
| Venn diagram | characteristics of ratios, rates, and both | 3 |
| make a table | that shows five or more ratios and rates as fractions in simplest form | 5+ |
| give | three examples of unit rate | 3 |
| express | given ratios as unit rates | any number |
| research | the history of the golden ratio and explain its purpose | 2 |
| investigate and discover | three examples of how the golden ratio has been used over the last 4000 years to create art and architecture Example: Pyramid of Khufu in Giza | 3 |
| describe | the golden ratio in your own words | 1 |
| define | a scale drawing as a drawing that is either smaller or larger than the actual object and give examples of scale drawings | 2 |
| explain | scale as the ratio of the lengths on a drawing to the actual lengths of an object | 1 |



Folded Chart



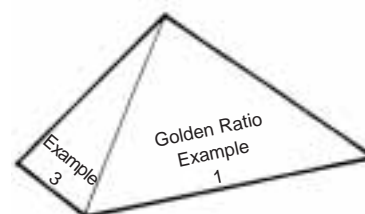
Three-tab Venn diagram



Two-Tab Book

Proportions

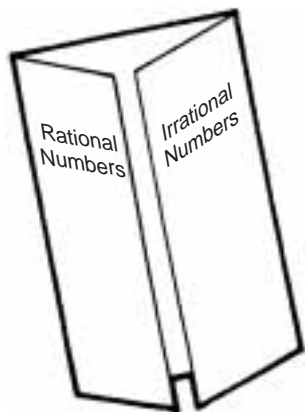
| Skill | Activity Suggestion | Foldable Parts |
|--------------|---|----------------|
| define | proportion as two equal fractions, or an equivalent relationship between two ratios | 1 |
| solve | given proportions | any number |
| determine | if two ratios form a proportion by checking their cross products Example: ratios, check, results | 3 |
| state | the property of proportions in your own words | 1 |
| define | extremes and means | 2 |
| demonstrate | how cross products can be used to tell whether two fractions form a proportion | any number |
| use | proportions to solve real-world problems | any number |
| | proportions to estimate populations | any number |
| Venn diagram | ratios, proportions, both | 3 |
| explain | pi as a constant of proportionality and give examples | 2 |



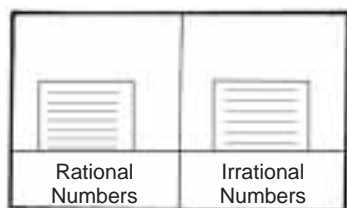
Pyramid Fold

| Terms and Examples |
|--------------------------|
| Ratio |
| Rate |
| Unit Rate |
| Golden Ratio |
| Scale |
| Proportion |
| pi = Constant Proportion |

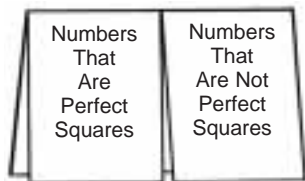
Layered Book
(4 sheets of paper)



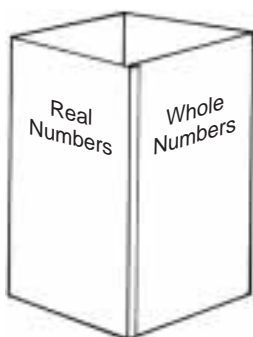
Shutter Fold



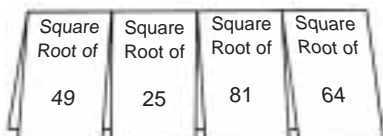
Pocket Book



Two-Tab Book



Standing Cube



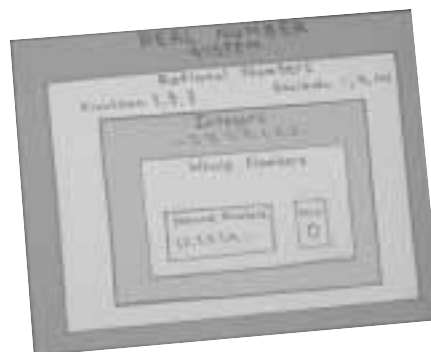
Four-Tab Book

Irrational Numbers

| Skill | Activity Suggestion | Foldable Parts |
|----------------------|---|----------------|
| define | irrational numbers as numbers that cannot be expressed as fractions $\frac{a}{b}$, where a and b are integers and b does not equal 0 | 1 |
| explain | irrational numbers in words and symbols | 2 |
| determine | whether three given numbers are rational or irrational and explain your reasoning | 3 |
| compare and contrast | rational and irrational numbers | 2 |
| give examples | of irrational numbers that are less than -15 | any number |
| describe | why pi and the square root of 3 are examples of irrational numbers | 2 |

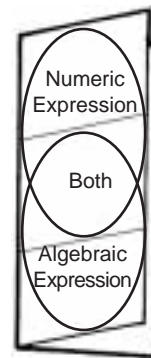
Real Number System

| Skill | Activity Suggestion | Foldable Parts |
|----------------------|---|----------------|
| design a concept map | that shows the set of real numbers is composed of the set of rational numbers and the set of irrational numbers | 2 |
| identify | numbers in the real number system | any number |
| explain | in words and symbols the real number system | 2 |
| Venn diagram | the real number system | 3 |
| chart | numbers into the categories of whole number, integer, rational, irrational, and real squares and square roots | 6 |
| define | a square root as one of two equal factors of a number | 1 |
| describe | a square root in words and symbols | 2 |
| find | the square root of 49, 25, 81, and 64 | 4 |
| estimate | square roots | any number |
| solve | equations by finding square roots | any number |
| compare and contrast | numbers that are and are not perfect squares | 2 |



Sets and Variables

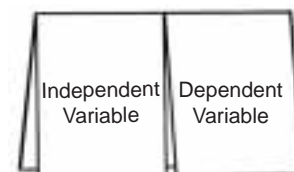
| Skill | Activity Suggestion | Foldable Parts |
|----------------------|--|----------------|
| define | a variable as a placeholder used in algebra | 1 |
| speculate | as to why variables are usually letters | 1 |
| explain | how the use of a variable can help solve algebra problems | 1 |
| define | like terms as terms with the same variable | 1 |
| compare and contrast | a numeric expression and an algebraic expression, or expressions with and without variables | 2 |
| chart | expressions in words and symbols, numerically, and algebraically | 3 or 4 |
| state | the Substitution Property of Equality (For all numbers a and b , if $a = b$, then a may be replaced with b .) | 1 |
| demonstrate | the use of the Substitution Property of Equality | 1 |
| show | multiplication and division notations used with variables | 2 |
| write | the meaning of several algebraic expressions | any number |
| evaluate | expressions containing variables | any number |
| translate | verbal phrases into algebraic expressions using variables | 2 |
| write | verbal phrases for given algebraic expressions | 2 |
| chart | words that can be used to denote addition, subtraction, multiplication, and division when reading or writing algebraic expressions | 4 |
| describe | the use of the following symbols in algebra: parentheses, brackets, and braces | 3 |
| compare | an independent variable and a dependent variable | 2 |
| research | the “who, what, when, where” of: Georg Cantor (1845–1918) developer of the theory of sets | 4 |



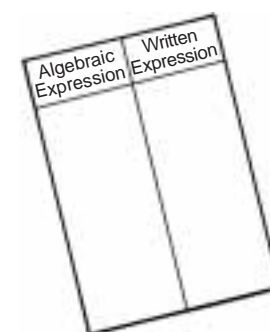
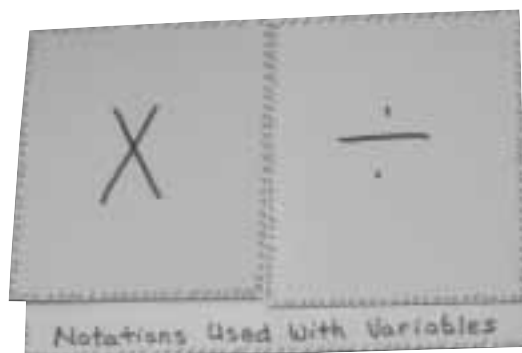
Three-Tab Venn Diagram



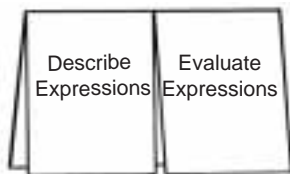
Three-Tab Book



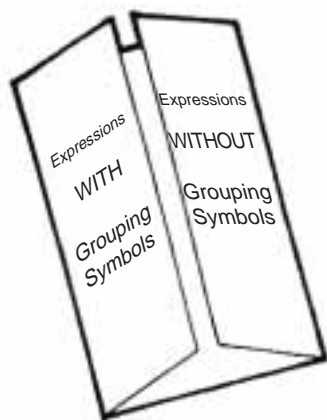
Two-Tab Book



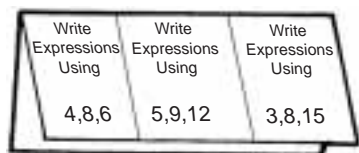
Folded Chart



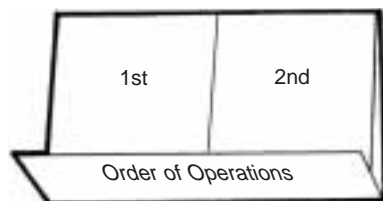
Two-Tab Book



Shutter Fold



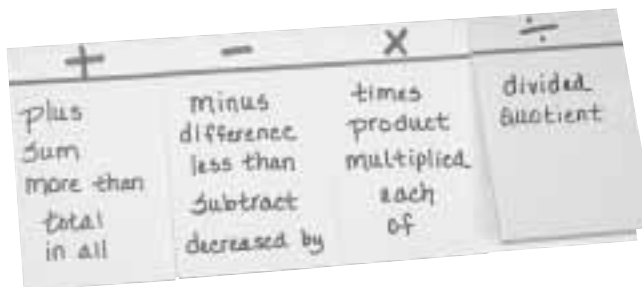
Three-Tab Book



Two-Tab Matchbook

Expressions

| Skill | Activity Suggestion | Foldable Parts |
|----------------------|--|----------------|
| define | a mathematical expression as any combination of numbers and operations such as addition, subtraction, multiplication, and division | 1 |
| describe | what it means to evaluate an expression | 1 |
| demonstrate | how an expression can have several numerical values | any number |
| explain | why it is important to have an order of operations when evaluating expressions | 1 |
| sequence | the steps used to find the value of an expression | any number |
| evaluate | expressions without grouping symbols using the order of operations | 2 |
| | expressions with grouping symbols using the order of operations | 2 |
| demonstrate | how the order of operations can be changed using grouping symbols | any number |
| illustrate | the use of brackets [] and parentheses () | 2 |
| write | ten expressions and find their values | 10 |
| show | different ways to indicate multiplication in an expression | 2 |
| | different ways to indicate division in an expression | any number |
| select | three numbers and use them to write as many expressions as you can | 3 |
| compare and contrast | expressions with and without variables | 2 |
| explain | that an expression is in its simplest form when it has no like terms and no parentheses | 1 |
| chart | expressions that are and are not in their simplest form | 2 |
| describe | radical expressions and give examples | 2 |
| explain | how to add, subtract, multiply and divide radical expressions | 4 |



Properties

| Skill | Activity Suggestion | Foldable Parts |
|----------------------|--|----------------|
| write | the Commutative and Associative Properties of Addition and Multiplication numerically and algebraically | 4 |
| use | the Commutative Properties of Addition and Multiplication to evaluate expressions | 2 |
| rewrite | expressions using the Commutative Property | 2 |
| use | the Associative Properties of Addition and Multiplication to evaluate expressions | 2 |
| rewrite | expressions using the Associative Property | any number |
| compare and contrast | the Associative and Commutative Properties | 2 |
| describe | the importance of the Identity Properties of Addition and Subtraction | 2 |
| describe and use | the Zero Product Property | 2 |
| make a table | to show seven properties of addition and multiplication | 7 |
| write | the Distributive Property in words and numerically | 2 |
| read | the expression $a(b + c)$ as “ a times the quantity b plus c ” | 1 |
| describe | in your own words the purpose of the Distributive Property | 1 |
| rewrite | expressions different ways using the Distributive Property | any number |
| restate | expressions using the Distributive Property | any number |
| show | how the Distributive Property can be used to simplify expressions with like terms | 1 |
| make a table | to describe and give examples of: Commutative Property of Addition Commutative Property of Multiplication Associative Property of Addition Associative Property of Multiplication Identity Property of Addition Identity Property of Multiplication Zero Product Property | any number |
| use | the Product Property of Radicals and the Quotient Property of Radicals to evaluate expressions | 2 |

| |
|---|
| Seven properties of addition and multiplication |
| 1 |
| 2 |
| 3 |
| 4 |
| 5 |
| 6 |
| 7 |

Layered Book
(4 sheets of paper)

| | | |
|------------|---------------|-------------------|
| Expression | Simplest form | Not simplest form |
| | | |
| | | |
| | | |
| | | |
| | | |

Folded Chart

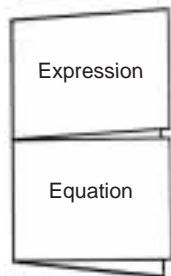
| | |
|------------|----------------------|
| Expression | Rewritten expression |
| | |
| | |
| | |
| | |
| | |

Layered Book
(3 sheets of paper)

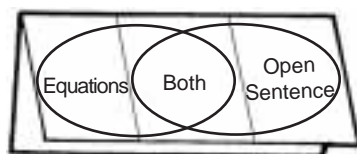


| | |
|------------------|-------------------|
| Product Property | Quotient Property |
|------------------|-------------------|

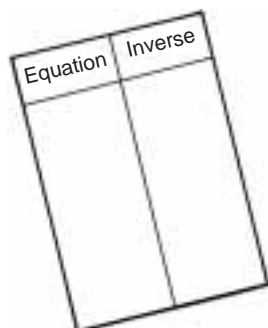
Two-Tab Book



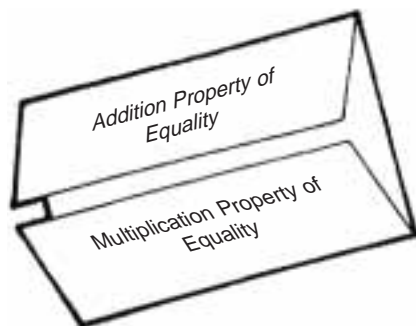
Two-Tab Book



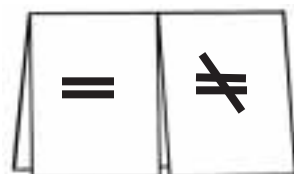
Three-Tab Venn Diagram



Folded Chart



Shutter Fold



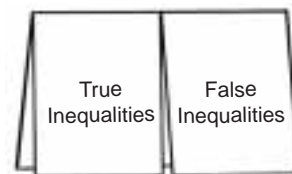
Two-Tab Book

Equations

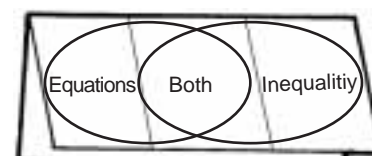
| Skill | Activity Suggestion | Foldable Parts |
|-----------------------|--|----------------|
| differentiate between | an expression and an equation | 2 |
| compare | an equation to a balance | 2 |
| Venn diagram | characteristics of equations, open sentences, and both | 3 |
| list | examples of equations | any number |
| tell | about equations that have no solution, or have a solution set that is null or empty | 2 |
| draw | two symbols that represent the empty or null set | 2 |
| compare and contrast | solution sets that are never true and solution sets that are always true | 2 |
| explain | why equations that contain variables are called open sentences | 1 |
| find | values for variables that make equations true | any number |
| explain | the solution of an equation | 1 |
| solve | equations with variables and write about how you found the solution | 2 |
| chart | solutions and open sentences | 2 |
| solve | equations with variables on each side | any number |
| | equations using inverse operations | any number |
| describe | how inverse operations “undo” each other | 1 |
| write | inverse operations for addition equations | 2 |
| | inverse operations for subtraction equations | 2 |
| solve | equations using the Addition Property of Equality | any number |
| solve | equations using the Subtraction Property of Equality | any number |
| write | examples of equations that are and are not equivalent | 2 |
| explain | when to use the Addition Property of Equality to solve an equation and give examples | 2 |
| solve | equations using the Division Property of Equality | any number |
| | equations using the Multiplication Property of Equality | any number |
| | six equations using rational numbers | 6 |
| | six equations with variables on each side | 6 |
| | six equations with grouping symbols | 6 |
| | ten equations that have an infinite number of solutions | 10 |
| explain | what is meant by the root, or roots, of three equations | 3 |
| use | integers in equations | any number |
| solve | equations containing rational numbers | any number |
| | equations with two or more operations | any number |
| write | five verbal problems for equations with two or more operations | 5 |

Inequalities

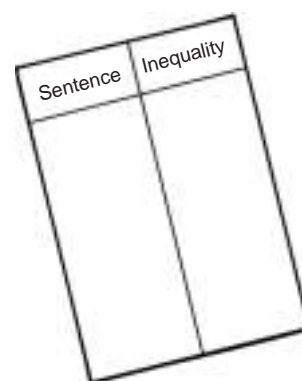
| Skill | Activity Suggestion | Foldable Parts |
|--------------|---|----------------|
| define | inequalities as mathematical sentences that contain greater than or less than symbols | 1 |
| write | inequalities that are true and inequalities that are false | 2 |
| | inequalities that are open, or contain a variable that must be replaced with a number | any number |
| chart | inequalities that are true, false, and open | 3 |
| explain | inequality signs that are a combination of the equals sign and the inequality symbols | 2 |
| chart | common phrases that are heard in everyday life that correspond to inequalities | any number |
| Venn diagram | methods for solving equations, inequalities, and both | 3 |
| solve | ten inequalities | 10 |
| write | sentences for inequalities and translate sentences into inequalities | 2 |
| | five inequalities and graph the solutions | 5 |
| solve | inequalities mentally | any number |
| state | in your own words the Addition Property of Inequality and give two examples | 2 |
| explain | the Subtraction Property of Inequality to someone | 1 |
| solve | inequalities by using the Addition and Subtraction Properties of Inequality | 2 |
| describe | the Addition and Subtraction Properties of Inequality in words and symbols | 4 |
| write | the Multiplication and Division Properties of Inequalities in words and symbols | 4 |
| solve | inequalities by multiplying or dividing by a positive number | 2 |
| | inequalities by multiplying by a negative number | 2 |
| solve | inequalities that involve more than one operation | 2 |
| Venn diagram | method for solving an inequality involving multiplication, and for solving an inequality involving division, both | 3 |
| use | inequality symbols when comparing fractions | any number |
| solve | inequalities containing rational numbers | any number |
| Venn diagram | solving an inequality with rational numbers, solving an inequality involving integers | 3 |
| solve | inequalities with multiple steps | any number |
| write | verbal problems with inequalities | any number |
| describe | a compound inequality as two inequalities connected by “or” or “and” and give examples | 2 |



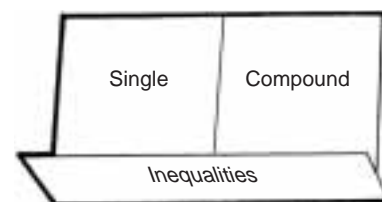
Two-Tab Book



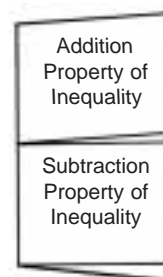
Three-Tab Venn Diagram



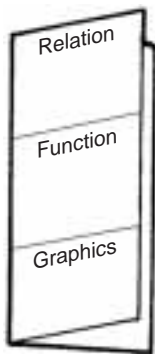
Folded Chart



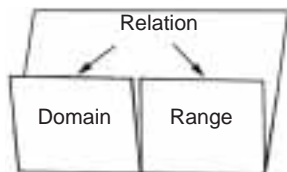
Two-Tab Matchbook



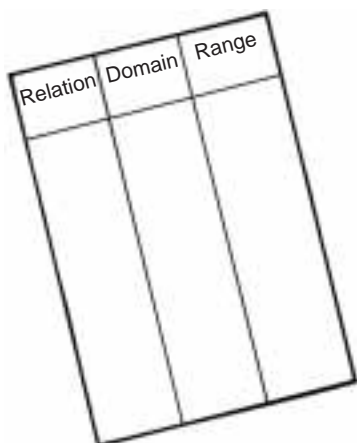
Two-Tab Book



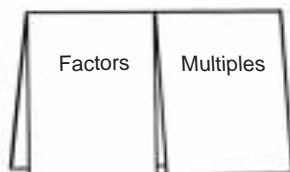
Three-Tab Book



Two-Tab
Concept Map Book



Folded Chart



Two-Tab Book



Bound Book

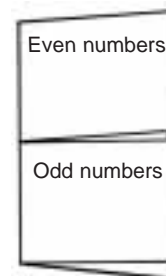
Relations and Functions

| Skill | Activity Suggestion | Foldable Parts |
|--------------|--|----------------|
| define | relations, functions, and graphing | 3 |
| Venn diagram | all functions are relations, but not all relations are functions | 3 |
| make | a concept map to show a relation as domain and range | 2 |
| write | the domain and range of given relations | 3 |
| define | function as a relation in which each element of the domain is paired with exactly one element in the range | 1 |
| graph | five relations to determine if they are functions | 5 |
| determine | whether four relations are functions by using the vertical line test | 4 |
| use | functions to describe relationships between two quantities | 2 |
| make | function tables | any number |
| use | function tables to find output values | any number |
| describe | the inverse of a relation | 1 |

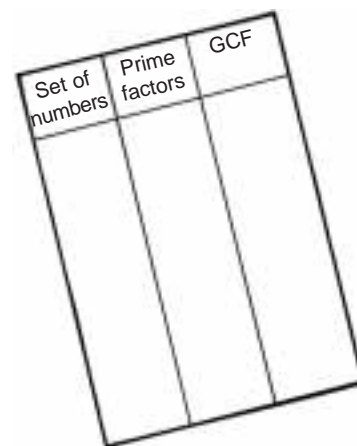


Factors

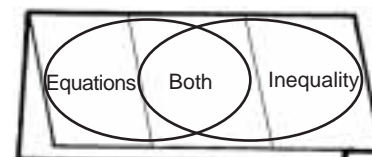
| Skill | Activity Suggestion | Foldable Parts |
|-----------------------|---|----------------|
| explain | that the factors of a whole number divide that number with a remainder of 0 | 1 |
| use | the phrase “divisible by” when describing the factors of a given number | 1 |
| determine | whether one number is a factor of another | any number |
| make a chart | of divisibility rules, examples, and descriptions | 3 |
| differentiate between | even and odd numbers and explain how they relate to factors | 2 |
| describe | multiplication facts as they relate to factors | 1 |
| explain | why 1 is a factor of every nonzero number | 1 |
| mentally determine | what five numbers are divisible by Example: 27, 64, 189, 370, 455 | 5 |
| chart | numbers with exactly 2, 3, 4, 5, and 6 factors | 5 |
| define | the greatest common factor of two or more numbers as the greatest factor these numbers have in common | 1 |
| list | the factors of three sets of numbers and find the greatest factor each set has in common | 3 |
| read | GCF as the “greatest common factor” | 1 |
| use | prime factorization to find the GCF of a set of numbers | any number |
| explain | how the product of the common prime factors of two or more monomials is their GCF | 1 |
| Venn diagram | find the GCF of two numbers by making a Venn diagram of their factors | 3 |
| define | relatively prime numbers as numbers with 1 as their only common factor | 1 |
| determine | whether given pairs of numbers are relatively prime | any number |
| define | a prime number as a whole number greater than one that has exactly two factors, one and itself | 1 |
| | a composite number as a whole number greater than one that has more than two factors | 1 |
| differentiate between | prime and composite numbers | 2 |
| prove | that a composite number can always be expressed as a product of two or more products | any number |
| explain why | 0 and 1 are considered neither prime nor composite | 2 |
| list | the factors of 1 and explain your list | 1 |
| describe | every whole number greater than 1 is either prime or composite | 1 |



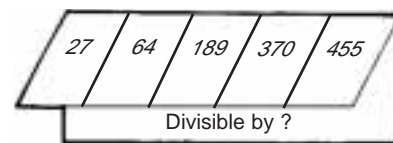
Two-Tab Book



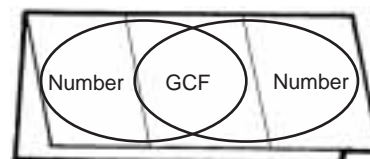
Folded Chart



Three-Tab Venn Diagram



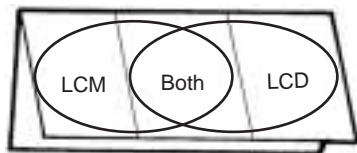
Five-Tab Book



Three-Tab Venn Diagram

| Multiples of |
|--------------|
| 2 |
| 3 |
| 4 |
| 5 |
| 6 |
| 7 |
| 8 |
| 9 |
| 10 |

Layered Book
(5 sheets of paper)



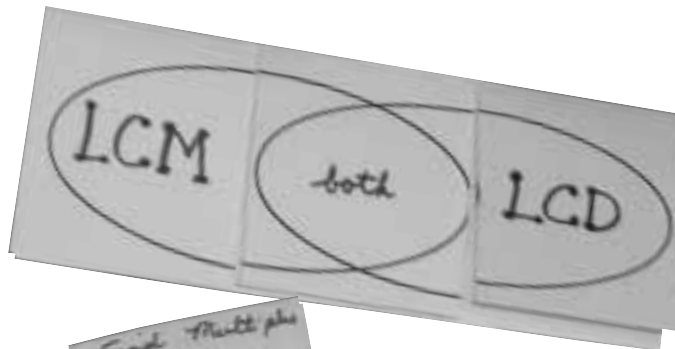
Three-Tab Venn Diagram

| First Number | Second Number | LCM |
|--------------|---------------|-----|
| | | |
| | | |
| | | |
| | | |
| | | |

Folded Chart

Multiples

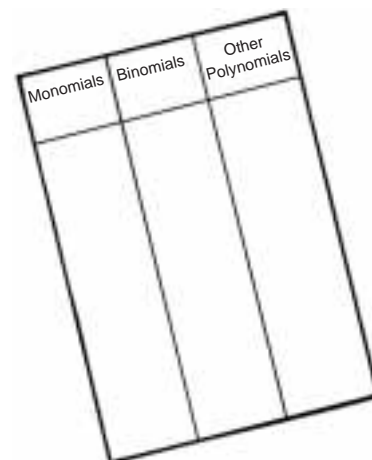
| Skill | Activity Suggestion | Foldable Parts |
|---------------|---|----------------|
| define | a multiple of a number as a product of that number and a whole number | 1 |
| chart | the multiples of 2, 3, 4, 5, 6, 7, 8, 9, and 10 | 9 |
| differentiate | between factors and multiples | 2 |
| find | the common multiples of two numbers such as 2 and 5 | 2 |
| determine | the least common multiple of two numbers | 2 |
| read | LCM as Least Common Multiple | 1 |
| use | a Venn diagram to find the LCM of two numbers using their prime factorization | 3 |
| find | the LCM of a set of numbers or algebraic expressions | any number |
| read | LCD as Least Common Denominator | 1 |
| find | the LCD for given pairs of fractions | any number |
| Venn diagram | finding a LCM, finding a LCD, both | 3 |
| explain | why fractions need the same denominator to be compared | 1 |
| find | factors and multiples | 2 |



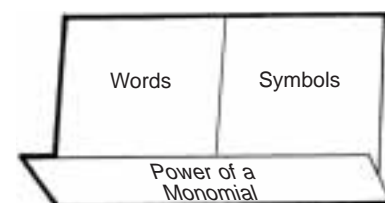
| Find Multiples of |
|-------------------|
| 2 |
| 3 |
| 4 |
| 5 |
| 6 |
| 7 |
| 8 |
| 9 |
| 10 |

Monomials and Polynomials

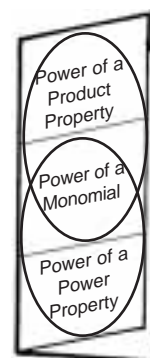
| Skill | Activity Suggestion | Foldable Parts |
|--------------|--|----------------|
| define | a monomial as an integer, a variable, or a product of integers and one or more variables | 1 |
| | a constant as a monomial that is a real number | 1 |
| Venn diagram | characteristics of monomials, constants, and both | 3 |
| list | ten examples of monomials and explain what they have in common | 10 |
| determine | whether an expression is or is not a monomial and explain your reasoning | 2 |
| multiply | monomials | any number |
| describe | in words and symbols the Power of a Monomial | 2 |
| Venn diagram | Power of a Product Property, Power of a Power Property, both = Power of a Monomial | 3 |
| divide | monomials | any number |
| explain | the degree of a monomial as the sum of the exponents of its variables | 1 |
| list | four monomials and their degrees | 4 |
| chart | examples of polynomials, or algebraic expressions, with one, two, three, and many terms | 4 |
| | examples of monomials, binomials, and trinomials | 3 |
| define | polynomial as a monomial, or a sum of monomials, and give four examples | 4 |
| find | the degree of three polynomials using the following: 1. find the degree of each term 2. determine the greatest degree of the terms 3. state the greatest degree of any term as the degree of the polynomial | 3 |
| add | polynomials and write about the process | any number |
| subtract | polynomials and write about the process | any number |
| find | the additive inverses of five polynomials | 5 |
| multiply | a polynomial by a monomial and outline the steps | 2 |
| simplify | four expressions involving polynomials | 4 |
| use | the FOIL method to multiply two binomials and the four steps | 4 |



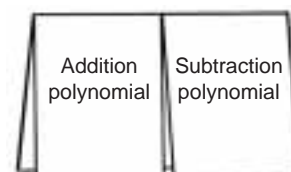
Folded Chart



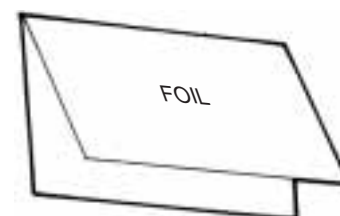
Two-Tab Matchbook



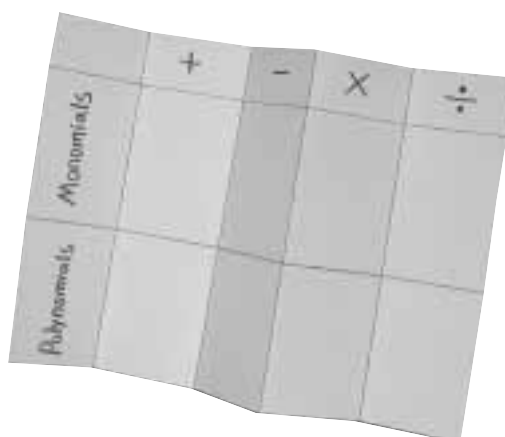
Three-Tab Venn Diagram

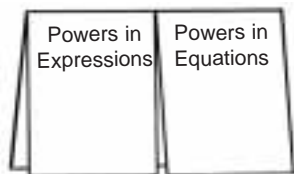


Two-Tab Book

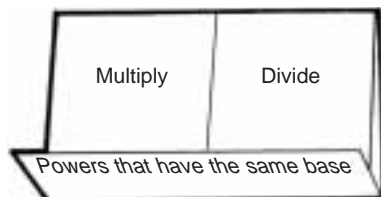


Half Book

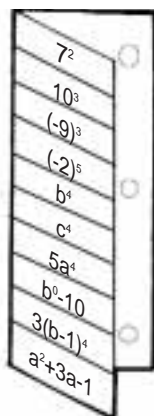




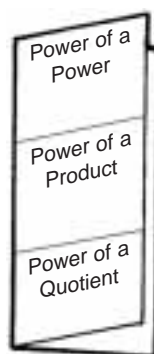
Two-Tab Book



Two-Tab Matchbook



Vocabulary Book



Three-Tab Book

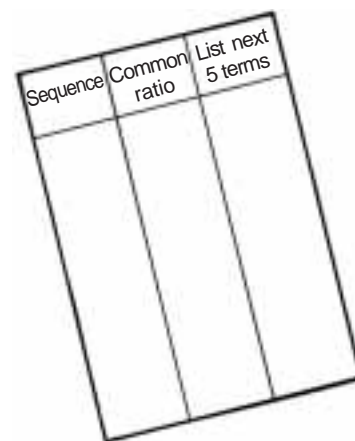
Powers and Exponents

| Skill | Activity Suggestion | Foldable Parts |
|----------------------|---|----------------|
| define | powers as numbers that are expressed using exponents | 1 |
| read | expressions containing powers | any number |
| describe | how the second and third powers have special names related to geometry | 2 |
| write | expressions containing powers | any number |
| | expressions containing powers as multiplication expressions | any number |
| write | powers as multiplication expressions | any number |
| explain | how to multiply powers that have the same base | 1 |
| | how to divide powers that have the same base | 1 |
| compare and contrast | products of powers and quotients of powers | 2 |
| use | powers in expressions and equations | 2 |
| define | scientific notation as numbers written as the product of a factor and a power of 10 | 1 |
| write | ten numbers using scientific notation | 10 |
| read | scientific notation | any number |
| order | numbers written in scientific notation | any number |
| compare | numbers in scientific notation with positive and negative exponents | 2 |
| use | scientific notation to evaluate five equations | 5 |
| outline | Properties of Powers—Power of a Power, Power of a Product, and Power of a Quotient | 3 |
| explain | how exponents are used to tell how many times a number is used as a factor | 1 |
| | rational exponents in words and symbols | 2 |
| define | the term base as it relates to exponents | 1 |
| write | four expressions using exponents | 4 |
| | three expressions with rational exponents in simplest radical form | 3 |
| evaluate | five expressions using exponents | 5 |
| show | expressions in either exponential or radical form | 2 |
| | numbers in standard and expanded form | 2 |
| use | the order of operations to evaluate algebraic expressions with powers | any number |
| write | expressions using positive and negative exponents | 2 |
| compare | the square of a difference and the square of a sum | 2 |
| tell | whether given expressions are in simplest form and why | 2 |

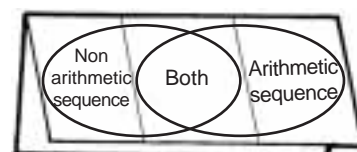


Sequences

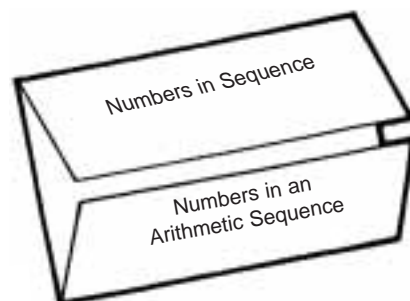
| Skill | Activity Suggestion | Foldable Parts |
|-----------------------|--|----------------|
| define | an arithmetic sequence | 1 |
| explain | how to describe even and odd numbers as arithmetic sequences | 2 |
| differentiate between | numbers in a sequence and numbers in an arithmetic sequence | 2 |
| compare and contrast | sequences that are and are not arithmetic | 2 |
| describe | the terms of a sequence | 1 |
| find | the next terms of five given sequences | 5 |
| determine | the common differences of three arithmetic sequences | 3 |
| write | an original arithmetic sequence | 1 |
| outline | the steps you took to write an arithmetic sequence | |
| write | expressions that represent terms in a sequence | any number |
| research | the Fibonacci sequence and why the Fibonacci sequence is not arithmetic | 2 |
| define | a geometric sequence | 1 |
| explain | how each term in a geometric sequence increases or decreases by a common factor, called the common ratio | 2 |
| determine | if given sequences are geometric | 2 |
| find | the common ratio of a geometric sequence and list the next five terms | 3 |



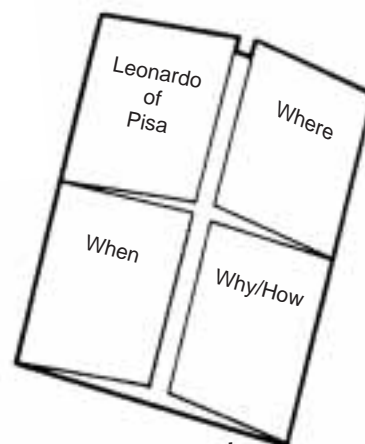
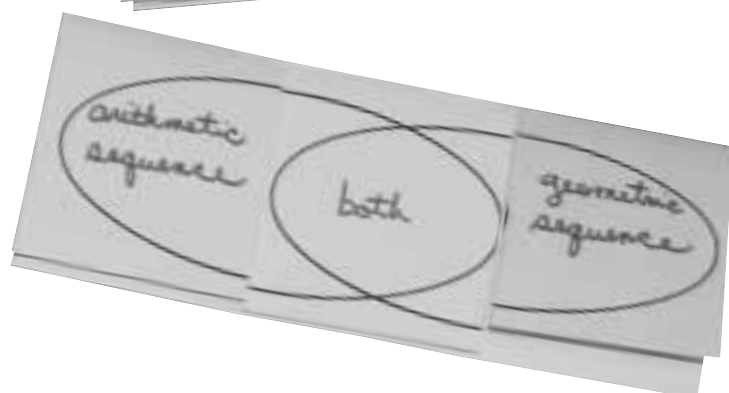
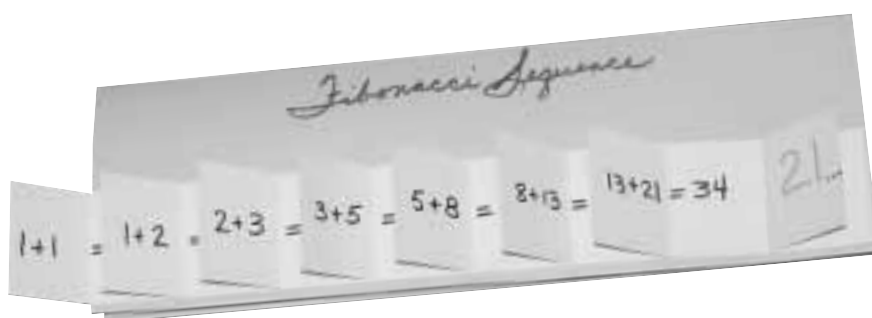
Folded Chart



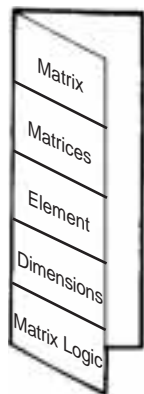
Three-Tab Venn Diagram



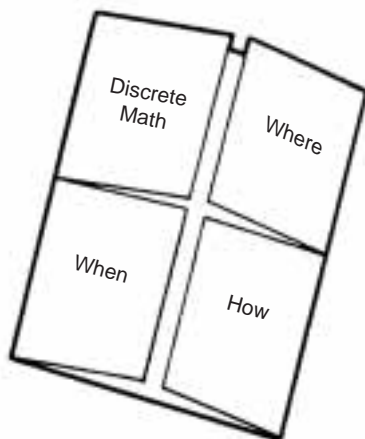
Shutter Fold



Four-Door Book



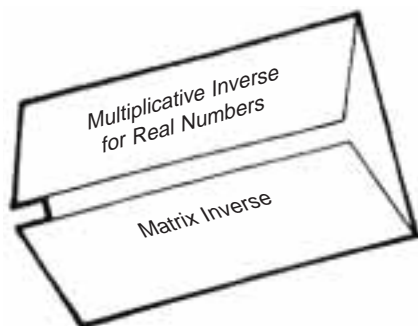
Five-Tab Book



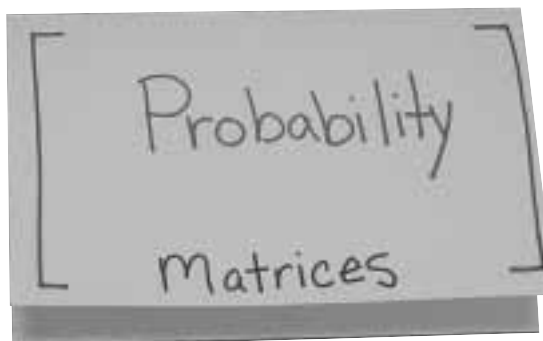
Four-Door Book

Matrices

| Skill | Activity Suggestion | Foldable Parts |
|----------------------|---|----------------|
| define | matrix, matrices, element, dimensions, matrix logic | 5 |
| explain | how matrices organize data and give an example | 2 |
| give | two examples of square matrices | 2 |
| use | the singular word “matrix” and its plural form “matrices” correctly | 2 |
| compare and contrast | a matrix and a table | 2 |
| illustrate | how a matrix can be used to add, subtract, and multiply quantities | 3 |
| describe | how a matrix can be used to solve systems of equations with one, two, and three variables | 3 |
| research | the “what, where, when, why/how” of discrete mathematics | 4 |
| | Nine Chapters on the Mathematical Art, 250 B.C. | 4 |
| list | and explain algebraic rules for using matrices: scalar multiplication of a matrix, addition and subtraction of matrices, and multiplying matrices | any number |
| give | two examples of probability matrices | 2 |
| write | the identity matrices for three square matrices | 3 |
| find | the inverses of three 2×2 matrices | 3 |
| compare and contrast | the multiplicative inverse for real numbers to the inverse matrix | 2 |

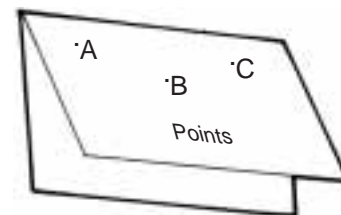


Shutter Fold



Points

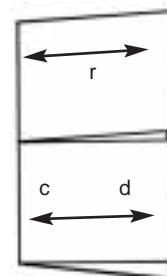
| Skill | Activity Suggestion | Foldable Parts |
|----------|--|----------------|
| describe | a point as a specific location in space with no size or shape that is represented by a dot and named with a capital letter | 1 |
| identify | and model points and coplanar points | 2 |
| graph | eight ordered pairs on a coordinate plane | 8 |
| find | the distance between two points on a number line and two points in a coordinate plane | 2 |
| identify | how many end points a line, line segment, and a ray have | 3 |



Half Book

Lines and Line Segments

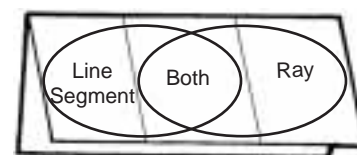
| Skill | Activity Suggestion | Foldable Parts |
|---------------|---|----------------|
| define | a line as a collection of points that extends in two directions, shown by arrowheads | 1 |
| list | two ways a line can be named | 2 |
| explain | a line segment as part of a line containing two endpoints and all of the points between | 1 |
| describe | how line segments are named | 1 |
| draw | and name five line segments | 5 |
| identify | and model lines that do and do not intersect | 2 |
| differentiate | between parallel lines and perpendicular lines | 2 |
| | between lines that intersect at a right angle and those that do not | 2 |
| illustrate | and explain a line called a <i>transversal</i> | 2 |
| find | the slopes of lines and use slope to identify parallel and perpendicular lines | 2 |



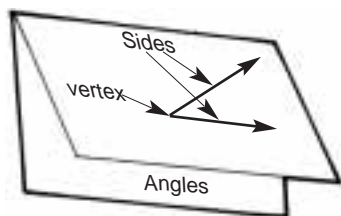
Two-Tab Book

Rays

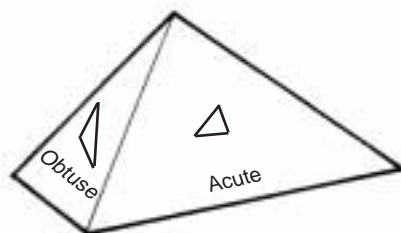
| Skill | Activity Suggestion | Foldable Parts |
|----------------------|--|----------------|
| define | a ray as a portion of a line that extends from one point infinitely in one direction | 1 |
| describe | how a ray is named | 1 |
| Venn diagram | characteristics of a line segment, a ray, and both | 3 |
| illustrate | how two rays form and define an angle | 2 |
| compare and contrast | collinear and noncollinear rays | 2 |



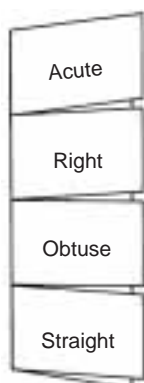
Three-Tab Venn Diagram



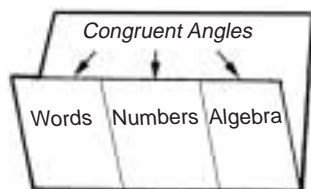
Folded Book



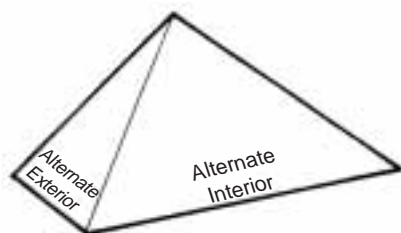
Pyramid Fold



Four-Tab Book



Three-Tab Concept Map



Pyramid Fold

Angles

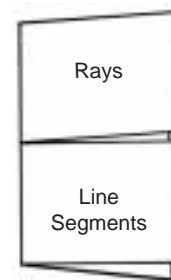
| Skill | Activity Suggestion | Foldable Parts |
|------------------|---|----------------|
| describe | an angle as two rays with the same endpoint | 1 |
| draw and label | the parts of an angle—vertex and sides | 2 |
| make | a concept map for “angles” | any number |
| summarize | and demonstrate how angles are measured and named | 2 |
| measure and name | ten angles using a protractor and report the measures in degrees | 10 |
| demonstrate | how a protractor can be used to draw an angle of a given measure | any number |
| differentiate | between acute, obtuse, and right angles | 3 |
| Venn diagram | characteristics of acute angles, obtuse angles, and both | 3 |
| classify | angles as acute, right, obtuse, or straight | 4 |
| explain | how an angle separates a plane into three parts: interior of the angle, exterior of the angle, and the angle itself | 3 |
| draw | an angle that is congruent to a given angle | 1 |
| construct | the bisectors of four given angles | 4 |

Angle Relationships

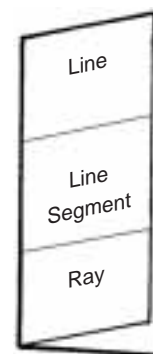
| Skill | Activity Suggestion | Foldable Parts |
|----------------------|---|----------------|
| justify | a straight line being called a “straight angle” | 1 |
| use | the term “transversal” when describing a line that intersects two parallel lines | 1 |
| draw | two intersecting lines and measure the angles formed | 2 |
| | parallel lines and measure the angles formed | 2 |
| | perpendicular lines and a transversal and explain why intersecting perpendicular lines form four right angles | 2 |
| show | rays and line segments can be perpendicular | 2 |
| describe | how the following are formed and give examples: vertical angles, adjacent angles, linear pair | 3 |
| differentiate | between complementary and supplementary angles | 2 |
| explain | alternate interior angles, alternate exterior angles, and corresponding angles | 3 |
| prove | that corresponding angles are congruent, alternate interior angles are congruent, and alternate exterior angles are congruent | 3 |
| compare and contrast | supplementary and complementary angles | 2 |

Planes

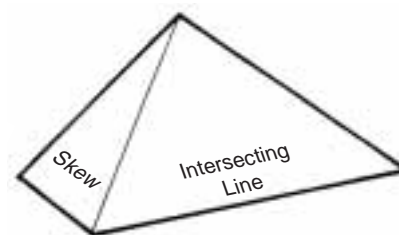
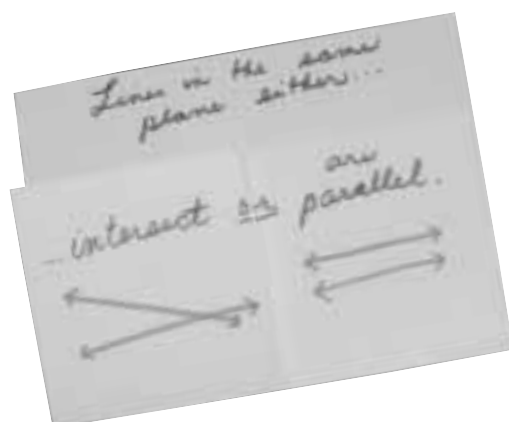
| Skill | Activity Suggestion | Foldable Parts |
|-----------------------------------|---|----------------|
| describe | a plane as a flat surface with no edges, or boundaries | 1 |
| explain | why lines in the same plane either intersect or are parallel | 2 |
| define | skew lines as two lines that do not intersect and are not in the same plane | 1 |
| draw | two examples of skew lines and explain why they are skew lines | 2 |
| find similarities and differences | between intersecting, parallel, and skew lines | 2 |
| Venn diagram | characteristics of parallel lines, skew lines, and both | 3 |
| illustrate | a rectangular prism and explain how it is formed by six planes | 2 |
| find | five examples of planes in your daily life | 5 |
| model | planes that do and do not intersect | 2 |
| write | five plane relationships and draw and label a figure for each | 5 |
| describe | and give four examples of coplanar points | 5 |
| compare | plane geometry and spherical geometry | 2 |



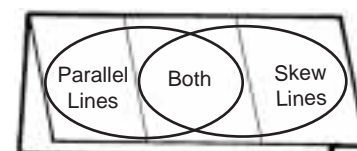
Two-Tab Book



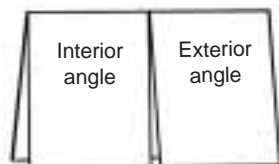
Three-Tab Book



Pyramid Fold



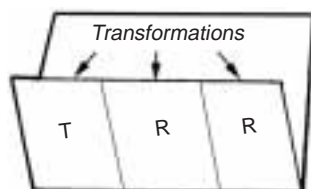
Three-Tab Venn Diagram



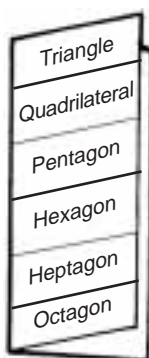
Two-Tab Book



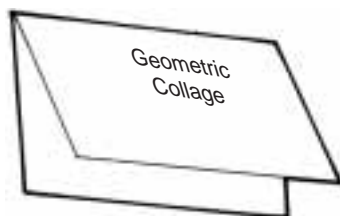
Vocabulary Book



Three-Tab Concept Map



Six-Tab Book



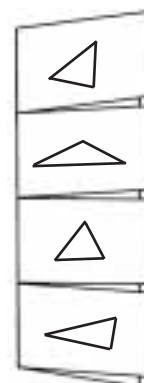
Half Book

Polygons

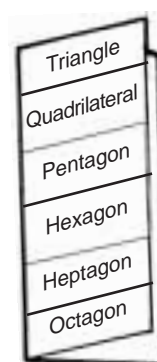
| Skill | Activity Suggestion | Foldable Parts |
|-----------------------|---|----------------|
| define | polygons as simple closed figures in a plane formed by three or more line segments | 1 |
| classify | polygon as convex or concave | 2 |
| determine | the sum of the measures of the interior and exterior angles of a polygon | 2 |
| | how and why polygons are classified by their sides | 2 |
| explain | the meaning of the following prefixes—tri-, quad-, penta-, hexa-, hepta-, octa-, nona-, deca-, dodeca-, n- | 9 |
| draw and label | a triangle, a quadrilateral, a pentagon, a hexagon, an octagon, and a decagon | 6 |
| label | the vertices of the polygons you draw | any number |
| define | a diagonal as a line segment that joins two nonconsecutive vertices | 1 |
| explain | diagonals can not be drawn in a triangle, but can be drawn in any polygons with more than three sides | 2 |
| | | |
| make a table | to show the number of sides, diagonals, and triangles formed in several different polygons—quadrilateral, pentagon, hexagon, heptagon, octagon | 5 |
| make a concept map | that shows a regular polygon is equilateral and equiangular | 2 |
| show | examples of interior and exterior angles of a polygon | 2 |
| differentiate between | polygons that are regular and polygons that are not regular | 2 |
| find | the sum of the measures of the interior angles of four different polygons heptagon = 900° nonagon = 1260° decagon = 1440° dodecagon = 1800° | 4 |
| make a table | to show the measures of the interior and exterior angles of three regular polygons | 3 |
| find | the perimeters of different polygons | any number |
| make a collage | of pictures of polygons | 1 |
| draw | a tessellation | 1 |
| determine | if three polygons will each tessellate | 3 |
| observe | tessellations in the form of quilts, fabric patterns, modern art, and more | any number |
| identify | regular and semi-regular (uniform) tessellations | 2 |
| define | transformations as movements of geometric figures | 1 |
| make a concept map | to show three types of transformations: translation, rotation, and reflection | 3 |
| draw | examples of translations, rotations, and reflections | 3 |

Triangles

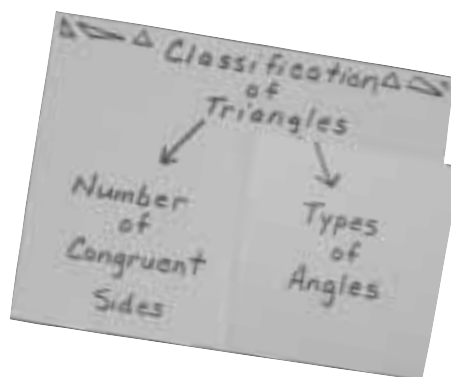
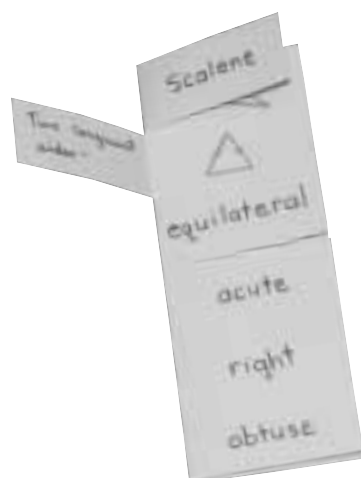
| Skill | Activity Suggestion | Foldable Parts |
|-------------------|---|----------------|
| define | a triangle as a three-sided polygon formed by three line segments that intersect only at their endpoints | 1 |
| | similarity of triangles as reflexive, symmetric, and transitive | 3 |
| | medians, altitudes, angle bisectors, and perpendicular bisectors | 4 |
| draw and label | a triangle and its vertices | 2 |
| name | triangles by their vertices | any number |
| find | the areas of three triangles | 3 |
| measure | the angles of four triangles | 4 |
| draw a conclusion | about the sum of the measures of the angles of all triangles | 1 |
| describe | the six types of triangles—acute, right, obtuse, equilateral, isosceles, and scalene | 6 |
| explain | how triangles are classified and classify four triangles by their angles and sides | 4 |
| draw and describe | two congruent triangles and their corresponding parts | 2 |
| make | a concept map on congruent triangles that explains how their corresponding sides are congruent and their corresponding angles are congruent | 2 |
| explain | how to find the area of a triangle in words and symbols | 2 |
| make a table | to define and give examples of the following: SSS, SAS, ASA, AAS | 4 |
| write | the Triangle Inequality Theorem and use it to show that some sets of line segments cannot be used to form triangles | 2 |

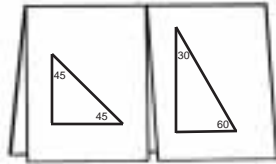


Four-Tab Book



Six-Tab Book

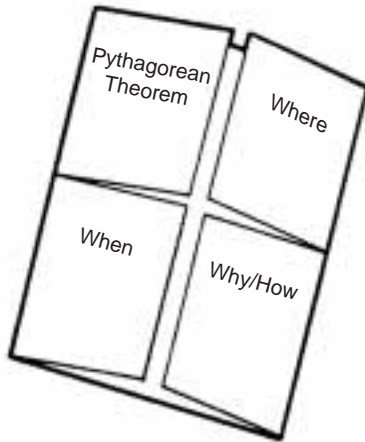




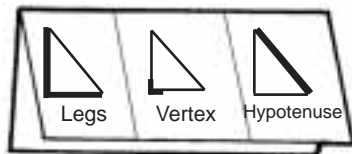
Two-Tab Book

Right Triangles

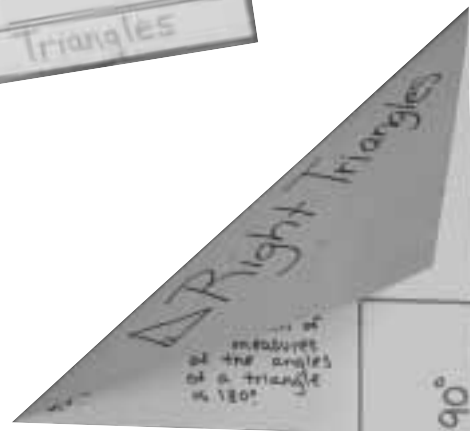
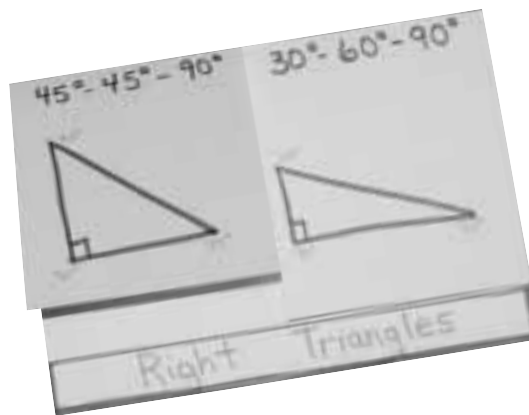
| Skill | Activity Suggestion | Foldable Parts |
|----------------------|---|----------------|
| label | the parts of a right triangle—right angle, legs, hypotenuse | 3 |
| research | the history of the Pythagorean Theorem | 4 |
| explain | the Pythagorean Theorem in words and symbols | 2 |
| use | the Pythagorean Theorem to find the length of a side of a right triangle | 1 |
| determine | whether a triangle is a right triangle and explain your reasoning | 2 |
| describe | how to find the length of a leg of a right triangle if you know the lengths of the hypotenuse and the other leg | 1 |
| draw and label | a diagram to show the three altitudes of a right triangle | 2 |
| construct | right triangles from a square and form an equilateral triangle | 2 |
| compare and contrast | 45°–45° right triangles, and 30°–60° right triangles | 2 |
| | tests for triangle congruence and tests for congruence of right triangles | 2 |
| illustrate | LL, HA, and LA as tests for congruence of right triangles | 3 |



Four-Door Book

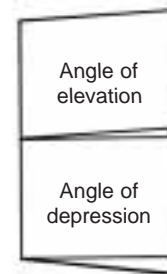


Three-Tab Book

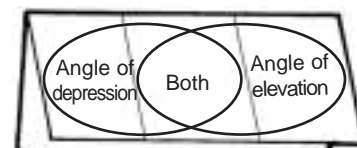


Right Triangle Trigonometry

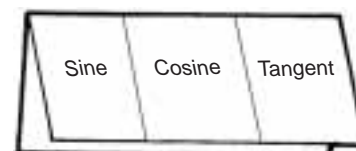
| Skill | Activity Suggestion | Foldable Parts |
|----------------------|---|----------------|
| describe | trigonometry as the study of triangle properties and relationships | 1 |
| explain | the etymology of the word trigonometry | 1 |
| define | trigonometric ratios as the ratios of the measures of the sides of a right triangle | 1 |
| investigate | the following trigonometric ratios—sine, cosine, tangent ratios | 3 |
| report on | the trigonometric ratios sine, cosine, and tangent in words and symbols | 3 |
| compare and contrast | the sine ratio with the cosine ratio | 2 |
| tell | how to decide whether to use sine, cosine, or tangent when trying to measure an acute angle in a right triangle | 3 |
| describe | an angle of elevation and how it is formed by a horizontal line and a line of sight above it | 2 |
| show | an angle of depression and how it is formed by a horizontal line and a line of sight below it | 2 |
| draw | a diagram of an angle of elevation and an angle of depression | 2 |
| Venn diagram | characteristics of angle of elevation, an angle of depression, and both | 3 |



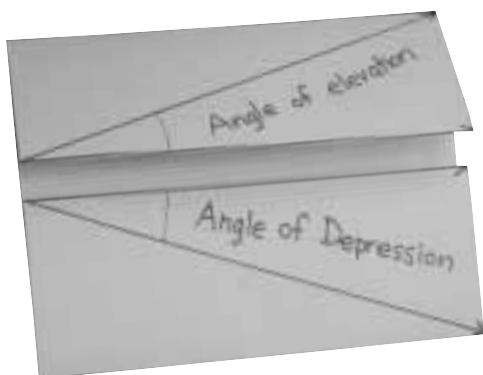
Two-Tab Book




Three-Tab Venn Diagram

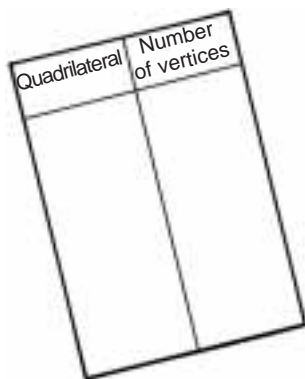


Three-Tab Book

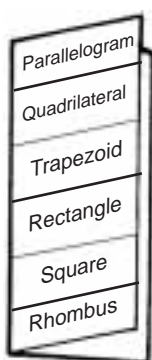


| | | |
|---|-------|---------|
|  | Words | Symbols |
| Sine | | |
| Cosine | | |
| Tangent | | |

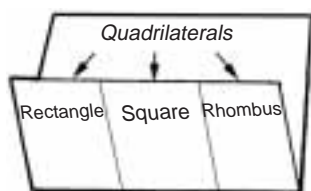
3 x 4 Folded Table



Folded Chart



Six-Tab Book



Three-Tab Concept Map

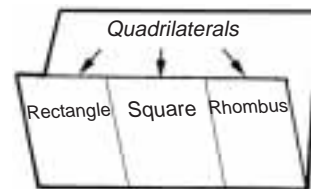
Quadrilaterals

| Skill | Activity Suggestion | Foldable Parts |
|----------------------|---|----------------|
| define | a quadrilateral as a closed figure formed by four line segments that intersect only at their endpoints | 1 |
| draw and label | a quadrilateral and its vertices | 2 |
| compare and contrast | a quadrilateral and a non-example of a quadrilateral | 2 |
| measure | the angles of several quadrilaterals | any number |
| draw a conclusion | about the sum of the measures of the angles of a quadrilateral | 1 |
| explain | how quadrilaterals can be classified | 1 |
| describe | six types of quadrilaterals: 1. quadrilaterals with no pairs of parallel lines 2. parallelogram = quadrilateral with two pairs of parallel sides 3. trapezoid = quadrilateral with exactly one pair of parallel sides 4. rectangle = parallelogram with four congruent angles 5. square = parallelogram with congruent sides and congruent angles 6. rhombus = parallelogram with congruent sides | 6 |
| make a concept map | that shows the six types of quadrilaterals | 6 |
| illustrate | different quadrilaterals and their diagonals | any number |

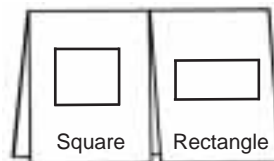


Squares, Rectangles, and Rhombi

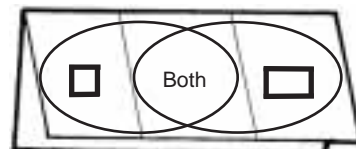
| Skill | Activity Suggestion | Foldable Parts |
|----------------------|--|----------------|
| describe | a square and a rectangle in words and symbols | 2 |
| Venn diagram | characteristics of a square, a rectangle, and both | 3 |
| describe | and illustrate two different quadrilaterals with four right angles—a square and a rectangle | 2 |
| find | the perimeters of rectangles, squares, and rhombi | 3 |
| | the areas of rectangles, squares, and rhombi | 3 |
| describe | equilateral and equiangular figures | 2 |
| draw | a square and a rectangle with the same area on grid paper | 2 |
| illustrate | the diagonals of squares and rectangles | 2 |
| make a table | to compare and contrast the following characteristics of squares and rectangles: <ul style="list-style-type: none"> • are diagonals congruent? • are pairs of opposite sides congruent? • are diagonals perpendicular? • is one pair of opposite sides parallel and congruent? | any number |
| summarize | and diagram the properties of a rectangle: <ul style="list-style-type: none"> • opposite sides are congruent and parallel • opposite angles are congruent • consecutive angles are supplementary • diagonals are congruent and bisect each other • all four angles are right angles | 5 |
| compare and contrast | squares and rhombi | 2 |
| diagram | the diagonals of a rhombus and prove that they are perpendicular | 2 |
| | the diagonals of a rhombus and show how they bisect opposite angles | 2 |
| Venn diagram | characteristics of rhombi, rectangles, and both | 3 |



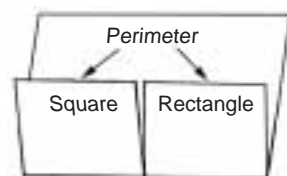
Three-Tab Concept Map



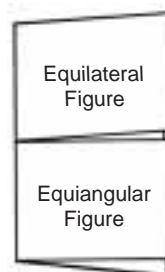
Two-Tab Book



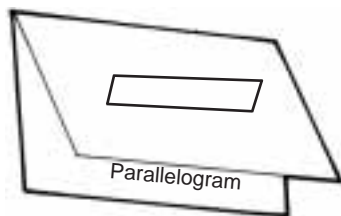
Three-Tab Venn Diagram



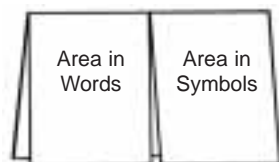
Two-Tab Concept Map



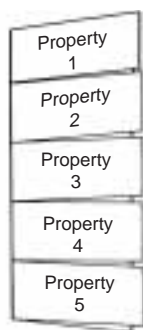
Two-Tab Book



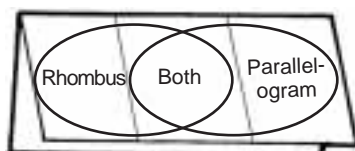
Half Book



Two-Tab Book



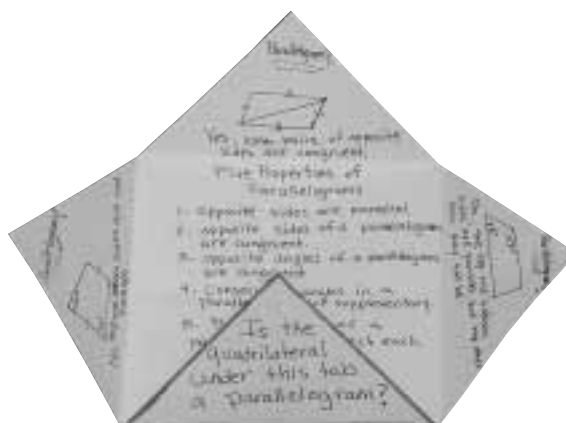
Five-Tab Book



Three-Tab Venn Diagram

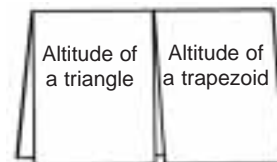
Parallelograms

| Skill | Activity Suggestion | Foldable Parts |
|-------------------|--|----------------|
| define | a parallelogram as a four-sided figure with both pairs of opposite sides parallel | 1 |
| draw | an example of a parallelogram | 1 |
| find similarities | between a general quadrilateral and a parallelogram | 2 |
| label | the base and the height of a parallelogram | 2 |
| find | the area of given parallelogram by multiplying the measures of the base and the height | any number |
| illustrate | a parallelogram and show its diagonals | 2 |
| describe | how to find the area of a parallelogram in words and in symbols | 2 |
| diagram | and explain the following five properties of parallelograms: <ul style="list-style-type: none"> • opposite sides are parallel • opposite sides are congruent • opposite angles are congruent • consecutive angles are supplementary • the diagonals bisect each other | 5 |
| use | the properties above to test four quadrilaterals to determine if they are parallelograms | 4 |
| write | a two-column proof and a paragraph proof for the following theorem: If one pair of opposite sides of a quadrilateral are parallel and congruent, then the quadrilateral is a parallelogram. | 2 |
| prove | that a quadrilateral with four congruent sides is a parallelogram | 1 |
| Venn diagram | characteristics of a rhombus, a parallelogram, and both | 3 |

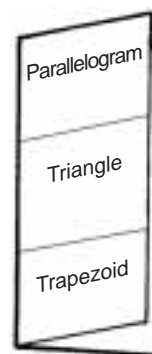


Trapezoids

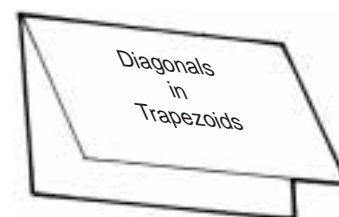
| Skill | Activity Suggestion | Foldable Parts |
|----------------------|---|----------------|
| define | a trapezoid as a quadrilateral with exactly two parallel sides called bases | 1 |
| draw | a trapezoid and label the bases, legs, and height or the altitude | 2 |
| explain | how you can use triangles to find the area of different trapezoids | any number |
| describe | how to find the area of a trapezoid in words and symbols | 2 |
| compare and contrast | the altitude of a triangle and the altitude of a trapezoid | 2 |
| draw | a parallelogram, a triangle, and a trapezoid with the same area on grid paper | 3 |
| illustrate | the diagonals in given trapezoids | any number |
| construct | the median of a trapezoid and outline the steps | 2 |
| compare | an isosceles triangle and an isosceles trapezoid | 2 |
| Venn diagram | characteristics of an isosceles trapezoid, a non-isosceles trapezoid, and both | 3 |
| recognize | the properties of trapezoids: <ul style="list-style-type: none"> the bases are parallel the median is parallel to the bases and its measure is half of the sum of the measures of the bases | 2 |



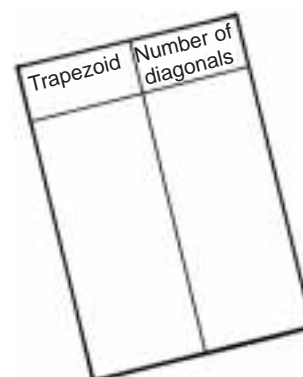
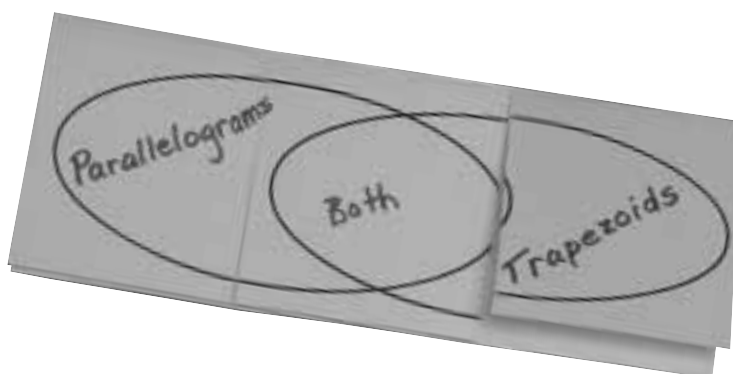
Two-Tab Book



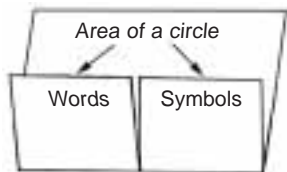
Three-Tab Book



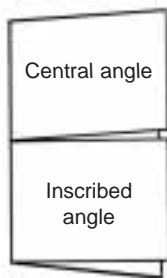
Half Book



Folded Chart



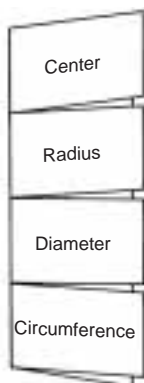
Two-Tab Concept Map



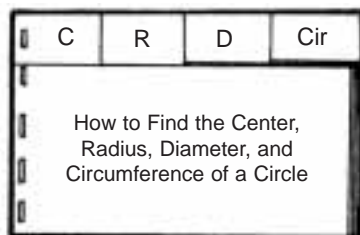
Two-Tab Book



Half Book



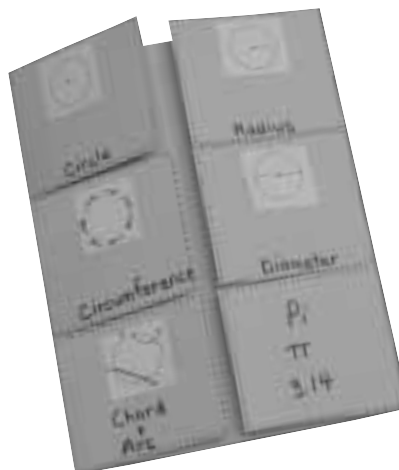
Four-Tab Book



Top-Tab Book

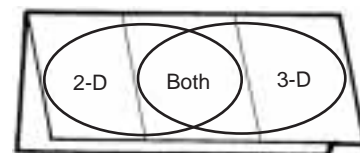
Circles

| Skill | Activity Suggestion | Foldable Parts |
|----------------------|---|----------------|
| use | a compass to draw circles | any number |
| define | center, radius, diameter, and circumference | 4 |
| label | the center, radius, diameter, and circumference of a circle | 4 |
| explain | how to find the radius of a circle if the diameter is known | any number |
| draw | three circles on grid paper and estimate their areas by counting grid squares | 3 |
| find | the circumference of a circle if given the radius and find the circumference given the diameter | 2 |
| | the area of a circle | any number |
| describe | in words and symbols how to find the area of a circle | 2 |
| explain | how to find the area of a circle if you know the measure of the radius | 1 |
| investigate | the history of and the use of pi, or 3.14159... | 2 |
| explain | why pi is not a rational number and give rational numbers that could be used as approximations for pi | 2 |
| illustrate | three chords of a circle | 3 |
| describe | the diameter of a circle as the longest chord that can be drawn and illustrate | 2 |
| illustrate | a central angle of a circle and describe it as an angle whose vertex is the center of a circle | 2 |
| label and measure | a central angle and the major and minor arcs it intercepts | 2 |
| compare and contrast | a central angle and an inscribed angle | 2 |
| use a compass | to draw a semicircle | 1 |
| differentiate | between concentric circles and congruent circles | 2 |
| | chords, tangents, and secants | 2 |
| recognize | tangents and use properties of tangents | 2 |

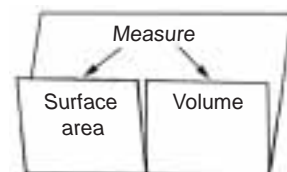


Three-Dimensional Figures

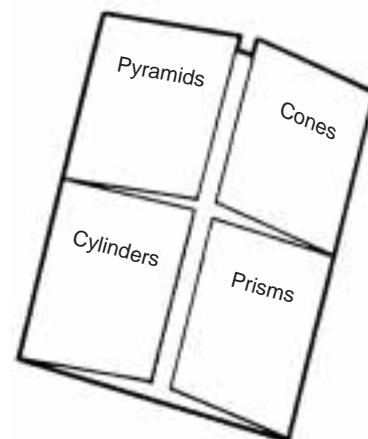
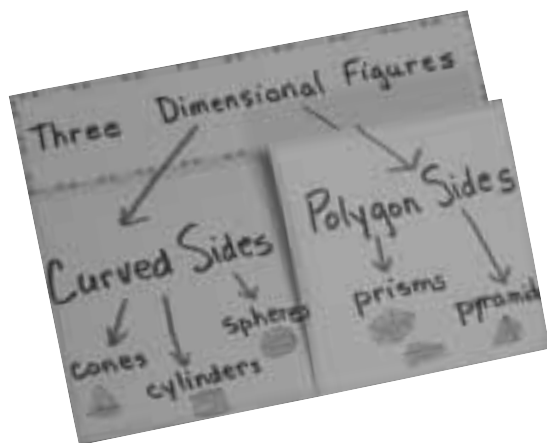
| Skill | Activity Suggestion | Foldable Parts |
|--------------|--|----------------|
| identify | three-dimensional figures | any number |
| Venn diagram | characteristics of two-dimensional figures, three-dimensional figures, and both | 3 |
| explain | surface area and volume as they relate to three-dimensional figures | 2 |
| list | examples of ways in which you use surface area and volume in your daily life | 2 |
| describe | how surface area is measured by square units and volume is measured in cubic units | 2 |
| use | top, front, side, and corner views of three-dimensional solids to make models | |
| draw | pyramids, cones, cylinders, and prisms | 4 |
| define | polyhedron and give three examples | 3 |
| illustrate | the five types of regular polyhedra, also called the Platonic solids | 5 |
| name | the edges, faces, and vertices of polyhedrons you draw | any number |



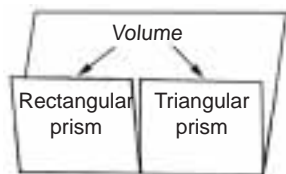
Three-Tab Venn Diagram



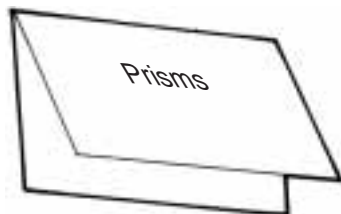
Two-Tab Concept Map



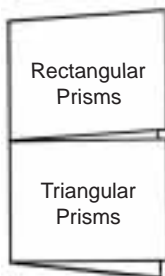
Four-Door Book



Two-Tab Concept Map



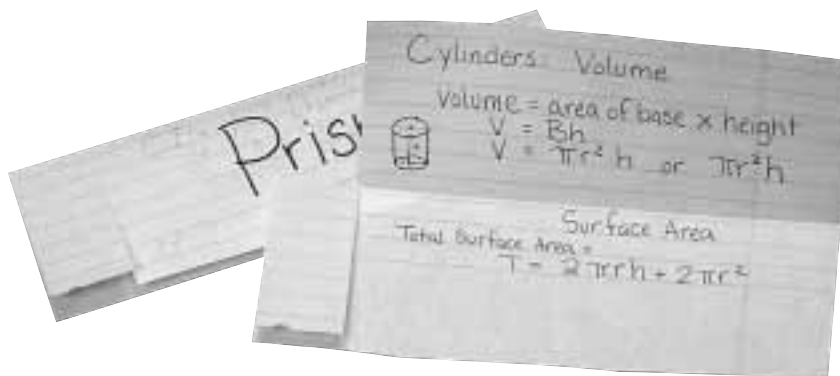
Half Book



Two-Tab Book

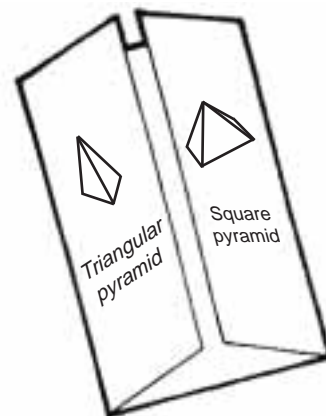
Prisms and Cylinders

| Skill | Activity Suggestion | Foldable Parts |
|--------------|--|----------------|
| define | prism as a solid figure that has two parallel congruent sides, called bases | 1 |
| explain | why you think prisms are named by the shape of their bases | 1 |
| draw | examples of rectangular prisms and triangular prisms | 2 |
| show | the nets of a rectangular and a triangular prism | 2 |
| find | the surface area of a rectangular prism | 1 |
| find | the surface area of a triangular prism | 1 |
| find | the volumes of a rectangular prism and a triangular prism | 2 |
| describe | in words and symbols how to find the volume of a prism | 2 |
| list | examples of prisms you encounter in your daily life | any number |
| define | cylinder as a three-dimensional shape with two parallel, congruent, circular bases | 1 |
| draw | a cylinder and label the bases and an altitude | 2 |
| list | examples of cylinders you encounter in a week's time | any number |
| show | the net of a cylinder | 1 |
| find | the surface area of a cylinder | 1 |
| find | the volume of a cylinder | 1 |
| describe | in words and symbols how to find the volume of a cylinder | 2 |
| Venn diagram | method for finding the volume of a prism, the volume of a cylinder, and both | 3 |

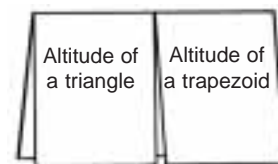


Pyramids and Cones

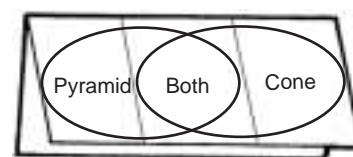
| Skill | Activity Suggestion | Foldable Parts |
|----------------------|---|----------------|
| define | pyramid as a solid figure that has a polygon for a base | 1 |
| explain | why you think pyramids are named by their bases | 1 |
| compare and contrast | a square pyramid and a triangular pyramid | 2 |
| describe | a pyramid's base, lateral faces, and vertex | 3 |
| illustrate | a pyramid's slant height and a pyramid's net | 2 |
| find | the surface area of a rectangular or triangular pyramid | 1 |
| | the volume of a rectangular or triangular pyramid | 1 |
| describe | in words and symbols how to find the volume of a pyramid | 2 |
| define | cone as a three-dimensional shape with a circular base and one vertex | 1 |
| show | the slant height and the net of a cone | 2 |
| explain | in your own words how to find the surface areas of a cone and a pyramid | 2 |
| describe | in words and symbols how to find the volume of a cone | 2 |
| Venn diagram | characteristics of a cone, a pyramid, and both | 3 |



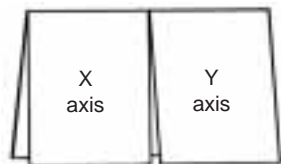
Shutter Fold



Two-Tab Book



Three-Tab Venn Diagram



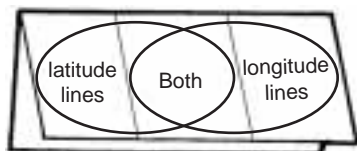
Two-Tab Book



Three-Tab Book

Coordinate Geometry

| Skill | Activity Suggestion | Foldable Parts |
|-----------------------|---|----------------|
| describe | a coordinate system as the intersection of two number lines that meet at their zero points | 1 |
| explain | how a point can be located using a coordinate system | 1 |
| define | origin as the intersection point of two number lines at their zero points | 1 |
| differentiate between | the x -axis and the y -axis | 2 |
| draw | a coordinate system and label the origin, x -axis, and y -axis | 2 |
| describe | how to use an ordered pair to graph a point on a coordinate system | 1 |
| mark and name | points on a grid | any number |
| name | the ordered pairs for given points a grid | any number |
| find | examples of coordinate systems used in your daily life | any number |
| Venn diagram | characteristics of latitude lines, longitude lines, and both | 3 |
| describe | how the two axes of a coordinate system to divide the coordinate plane into four regions called quadrants | 4 |
| draw | a coordinate system and label the origin, axes, and quadrants | 3 |
| explain | what it means to graph or plot a point | 1 |
| plot | points such as (5, 7) and (7, 5) and explain how they differ | any number |
| graph | points on a coordinate plane and name them | any number |

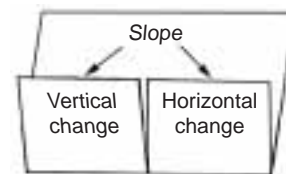


Three-Tab Venn Diagram

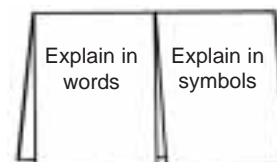


Slope

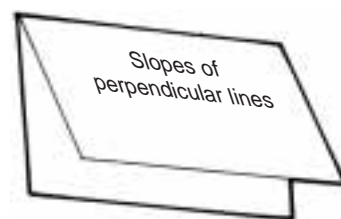
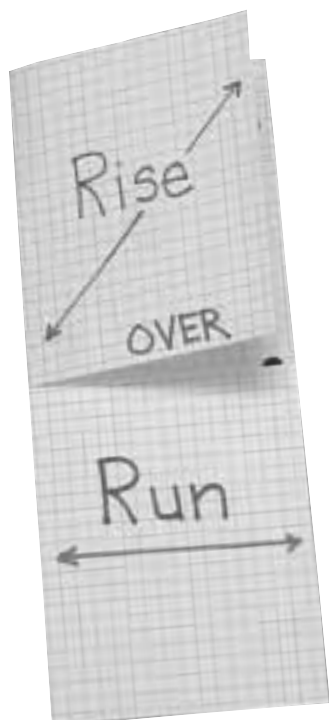
| Skill | Activity Suggestion | Foldable Parts |
|-----------------------|---|----------------|
| define | the slope of a line | 1 |
| differentiate between | the vertical change, or the change in y , and the horizontal change, or the change in x | 2 |
| find | the slope of a line when given two points on the line | any number |
| explain | in words and symbols how to find the slope of a line | 2 |
| illustrate | the rise (vertical change) and the run (horizontal change) of a line | 2 |
| describe | slope as “rise over run” | 1 |
| define | parallel lines as lines that will never intersect | 1 |
| explain | the relationship between the slopes of parallel lines | 1 |
| make a conjecture | about the slopes of perpendicular lines | 1 |



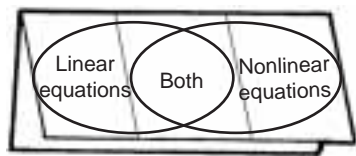
Two-Tab Concept Map



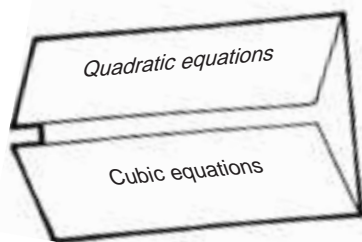
Two-Tab Book



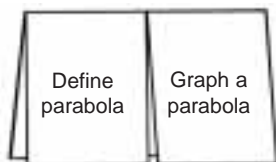
Half Book



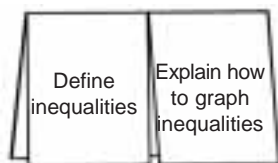
Three-Tab Venn Diagram



Shutter Fold



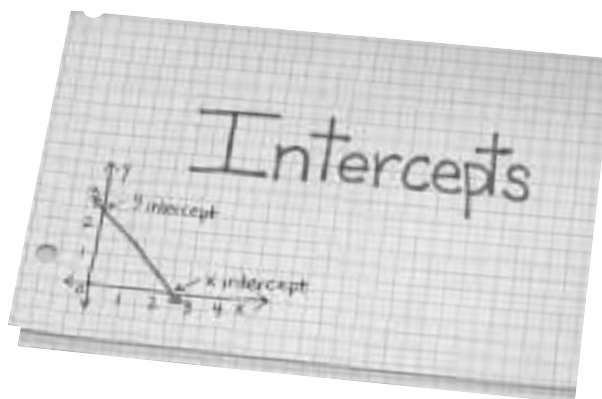
Two-Tab Book



Two-Tab book

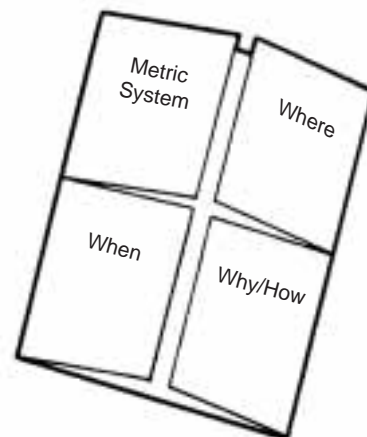
Graphing Equations and Inequalities

| Skill | Activity Suggestion | Foldable Parts |
|----------------------|--|----------------|
| graph | linear equations in two variables | any number |
| find | the x - and y -intercepts of graphs | any number |
| graph | linear equations using the x - and y -intercepts | any number |
| Venn diagram | characteristics of linear equations, nonlinear equations, and both | 3 |
| compare and contrast | quadratic equations and cubic equations | 2 |
| explore | the characteristics of slope | 1 |
| find | the slope of a line given its equation | any number |
| investigate | rate of change | 1 |
| graph | linear inequalities | any number |
| define | parabola | 1 |
| illustrate | the graph of a parabola | 1 |
| use | tables and graphs to write linear functions | 2 |
| define | inequalities | 1 |
| explain | how to graph inequalities | 1 |



Metric Measurement

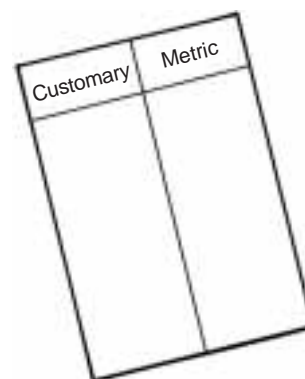
| Skill | Activity Suggestion | Foldable Parts |
|-------------|--|----------------|
| investigate | the development of the metric system of measurement by French scientists in 1795 | 1 |
| define | a meter (m) as $\frac{1}{10,000,000}$ of the distance between the North Pole and the Equator | 1 |
| chart | the prefixes used with the metric system | any number |
| note | each place value is 10 times the place value to its right | any number |
| make | a place value chart for the metric system | any number |
| convert | measurements within the metric system | any number |
| | Customary units to metric units | any number |



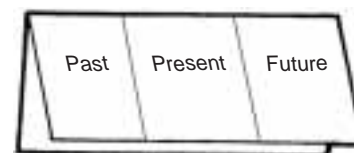
Four-Door Book

Length, Width, and Height

| Skill | Activity Suggestion | Foldable Parts |
|----------|---|----------------|
| research | the history of the measurement of length, width, and height | 3 |
| explain | inches, feet, yards | 3 |
| | millimeters, centimeters, meters | 3 |
| write | word problems based upon length and width | any number |
| | measurements in numbers and words | any number |
| read | Customary and metric measurements of length and width | 2 |
| | instruments used to record length, width, and height | any number |
| record | common uses of length and width | any number |



Folded Chart



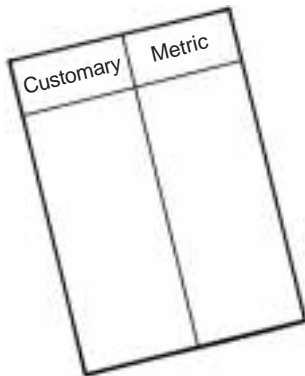
Three-Tab Book



Half Book

Distance

| Skill | Activity Suggestion | Foldable Parts |
|-------------|---|----------------|
| define | distance as the space between two points or locations | 1 |
| research | the history of the measurement of distance | any number |
| explain | inches, feet, yards, miles | 4 |
| | centimeters, meters, kilometers | 3 |
| write | word problems based upon distance | any number |
| read | instruments used to measure distance | any number |
| investigate | light-years and explain how and why this unit of measurement was developed | 2 |
| | astronomical units (AU) | 1 |
| | microns, or millionths of a meter, and millimicrons, or thousandths of a micron | 2 |



Folded Chart

Weight

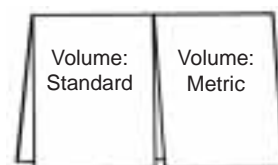
| Skill | Activity Suggestion | Foldable Parts |
|-------------|---|----------------|
| define | weight as the gravitational force, or pull, on an object | 1 |
| explain | why objects have no weight in space | 1 |
| | why objects on a planet smaller than Earth would weigh less than they do on Earth | 1 |
| investigate | common units of weight measurement: ounce/pound and gram/kilogram | 2 |
| estimate | weight based upon experiences | any number |



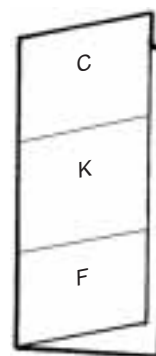
Two-Tab Book

Volume

| Skill | Activity Suggestion | Foldable Parts |
|----------------------|---|----------------|
| define | volume as the amount of space something occupies | 1 |
| compare and contrast | the measurement of volume of a solid and a liquid | 2 |
| find | the volume of two rectangular solids by using the formula $V = \ell wh$ | 2 |
| | the volume of a cylinder using the formula $V = \pi r^2 h$ | 1 |
| | the volume of a sphere using the formula $V = \frac{4}{3} \pi r^3$ | 1 |
| evaluate | the number of cubic inches in a cubic foot and the number of cubic centimeters in a cubic meter | 2 |
| describe | how liquids are measured in the customary system and in the metric system | 2 |
| use | gallons, quarts, pints, and fluid ounces | 4 |
| | liters and milliliters | 2 |



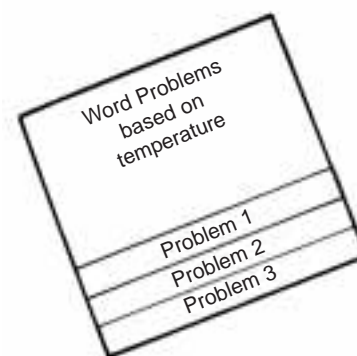
Two-Tab Book



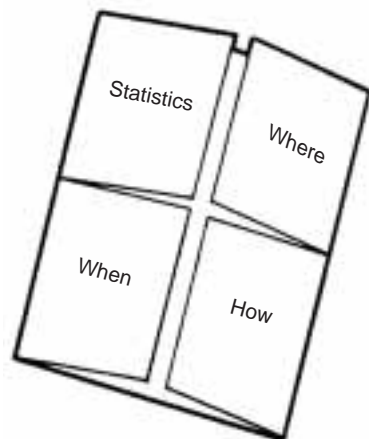
Three-Tab Book

Temperature

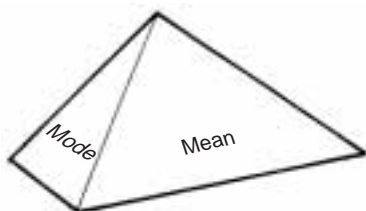
| Skill | Activity Suggestion | Foldable Parts |
|--------------------|---|----------------|
| research | the history of the measurement of temperature | any number |
| write | three word problems based upon temperature | 3 |
| read | and report metric and customary system measurements of temperature | 2 |
| differentiate | between degrees Celsius and degrees Fahrenheit | 2 |
| research and graph | the average body temperatures of five animals | 5 |
| make a table | of average air temperatures of different geographic regions or areas | any number |
| | of average surface and core temperatures of the planets in our solar system | 2 |
| record | temperatures at predetermined intervals over a given period of time | 2 |
| read | instruments used to measure temperature | any number |
| investigate | the International Temperature Scale of 1990 | 1 |
| | Kelvin, K, the unit of thermodynamic temperature | 1 |
| | absolute zero, -273.15°C or -459.67°F | 1 |



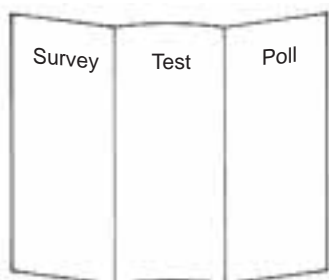
Layered-Look Book
(2 sheets of paper)



Four-Door Book



Pyramid Fold



Trifold Book



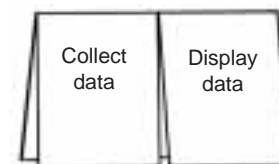
Three-Tab Book

Statistics

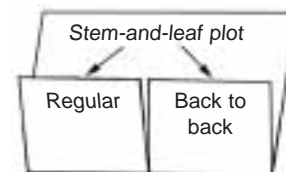
| Skill | Activity Suggestion | Foldable Parts |
|------------|--|----------------|
| define | statistics as a branch of mathematics that involves collecting and presenting data | 1 |
| describe | ways in which statisticians collect and present data | 2 |
| define | mean, median, and mode individually and collectively as measures of central tendency of a set of data | 3 |
| analyze | data using mean, median, and mode | 3 |
| find | the mean and median for a set of data | 2 |
| explain | the range of a set of numbers | 1 |
| determine | the range of a set of data | any number |
| separate | a large set of data into four equal parts, or quartiles | 4 |
| illustrate | how the median of a set of data divides the data in half | 2 |
| write | the definition of interquartile range in words and symbols | 2 |
| sequence | the steps for finding the range and interquartile range of a set of data. 1. List the data from least to greatest. 2. Find the median. 3. Find the upper quartile, or the median of the upper half. 4. Find the lower quartile, or the median of the lower half. 5. Find the interquartile range by subtracting the upper quartile range from the lower quartile range. | 5 |
| use | measures of variation to compare data | any number |
| list | ways in which measures of variation are used in everyday life or in a work place | any number |
| find | the range, median, upper quartile, lower quartile, and the interquartile range for sets of data | 5 |
| describe | how statistics are used in written and oral communication to prove points and influence opinions | 2 |
| explain | ways in which statistics might be misleading | any number |
| recognize | and find examples of misleading statistics | any number |
| find | examples of graphs in a newspaper or magazine, determine if they are or are not misleading, and explain why or why not | 2 |
| list | things you might question when reading the results of a survey, test, or poll | any number |
| use | the same data with two different scales and explain how these graphs look different | 2 |

Stem-and-Leaf Plots

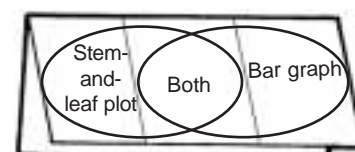
| Skill | Activity Suggestion | Foldable Parts |
|----------------------|--|----------------|
| describe | a stem-and-leaf plot | 1 |
| define | the stem and leaf | 2 |
| illustrate | how to organize data into stems and leaves | 2 |
| explain | the purposes of the “stem” and the “leaf” | 2 |
| show | how data values with numerous digits can be rounded so that each leaf has only one digit | 1 |
| collect | data that can be organized into a stem-and-leaf plot, such as student grades on a test | any number |
| display | data in stem-and-leaf plots | any number |
| sequence | the steps used for making a stem-and-leaf plot | any number |
| interpret | data presented in stem-and-leaf plots made by classmates | any number |
| compare and contrast | a regular stem-and-leaf plot and a back-to-back stem-and-leaf plot | 2 |
| make | a back-to-back stem-and-leaf plot | 1 |
| Venn Diagram | characteristics a stem-and-leaf plot, a bar graph, and both | 3 |



Two-Tab Book



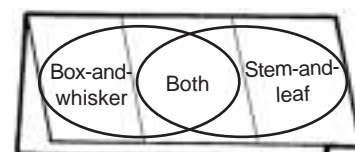
Two-Tab Concept Map



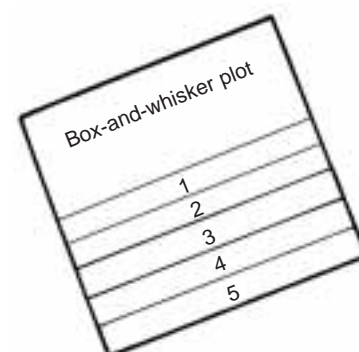
Three-Tab Venn Diagram

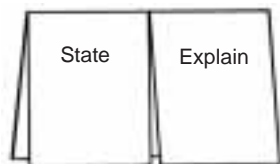
Box-and-Whisker Plots

| Skill | Activity Suggestion | Foldable Parts |
|--------------|--|----------------|
| define | quartiles and extreme values of a set of data as each relate to a box-and-whisker plot | 2 |
| display | data in box-and-whisker plots | any number |
| explain | the purpose for using box-and-whisker plots and describe how they present important characteristics of data visually | 1 |
| sequence | the steps for constructing a box-and-whisker plot. 1. Draw a number line for the range of the data. 2. Above the number line, mark points for the upper and lower extremes, the median, and the upper and lower quartile values. 3. Draw a box that contains the quartile values. 4. Draw a vertical line through the median value. 5. Extend the whiskers from each quartile to the upper and lower extreme data points. | 5 |
| list | five things that can be learned from a box-and-whisker plot | 5 |
| define | outliers as data that are more than 1.5 times the interquartile range from the quartiles | 1 |
| Venn Diagram | characteristics of a box-and-whisker plot, a stem-and-leaf plot, and both | 3 |



Three-Tab Venn Diagram

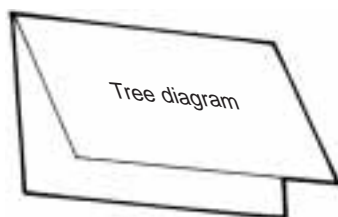

Layered-Look Book
(3 sheets of paper)



Two-Tab Book



Two-Tab Book



Half Book



Two-Tab Book

Fundamental Counting Principle

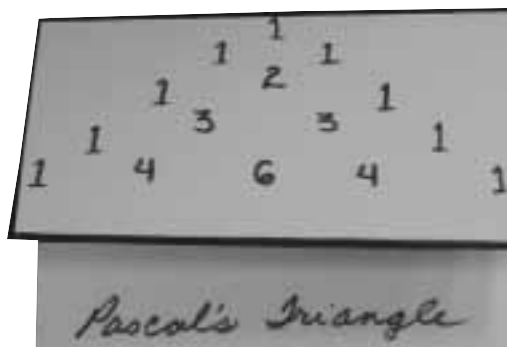
| Skill | Activity Suggestion | Foldable Parts |
|----------|---|----------------|
| explain | the Fundamental Counting Principle | 1 |
| draw | a tree diagram to show the possible outcomes for two events, such as tossing a dime and then tossing a nickel, and explain your drawing | 2 |
| describe | independent events and dependent events as they relate to the Fundamental Counting Principle | 2 |

Frequency Tables

| Skill | Activity Suggestion | Foldable Parts |
|-----------------------|--|----------------|
| describe | the purpose of a frequency table | 1 |
| differentiate between | a frequency table and a bar graph | 2 |
| explain | why a frequency table is good when you want to know specific numbers | 1 |

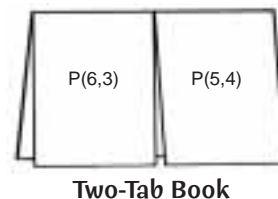
Pascal's Triangle

| Skill | Activity Suggestion | Foldable Parts |
|-----------------|--|----------------|
| define | the following terms as they relate to Pascal's triangle: expand powers, binomials, binomial theorem, exponents, coefficients | 5 |
| explain | Pascal's triangle in your own words | 1 |
| | the Binomial Theorem in your own words | 1 |
| describe | how to form two additional rows of Pascal's triangle | 2 |
| research | the "who, what, where, when" of: Blaise Pascal and Pascal's triangle | 4 |
| | Sir Isaac Newton and his discovery of ways in which the Binomial Theorem can lead to an infinite series | 4 |
| make a timeline | of the history of this triangle | any number |

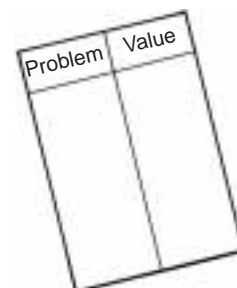


Permutations

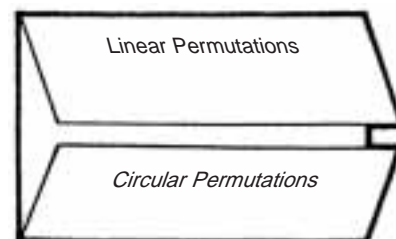
| Skill | Activity Suggestion | Foldable Parts |
|---------------|--|----------------|
| define | permutation as an arrangement or listing in which order is important | 1 |
| use | the symbol $P(6, 3)$ to represent the number of permutations of 6 things taken 3 at a time | 1 |
| find | values for problems such as $P(5, 5)$ and make models to illustrate their meaning | 2 |
| observe | two ways in which you might use permutations in your daily life | 2 |
| list | three examples of permutations | 3 |
| write | four permutations as word problems | 4 |
| differentiate | between linear permutations and circular permutations | 2 |
| explain | the rule for permutations with repetitions in writing and give an example | 2 |
| determine | whether something is a combination or a permutation | 2 |



Two-Tab Book



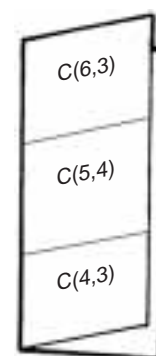
Folded Chart



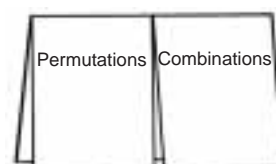
Shutter Fold

Combinations

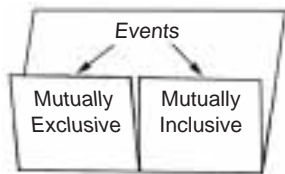
| Skill | Activity Suggestion | Foldable Parts |
|-----------------------|--|----------------|
| differentiate between | permutations and combinations | 2 |
| summarize | the difference between a permutation and a combination of 3 things taken 2 at a time | 2 |
| draw | models to illustrate two combinations | 2 |
| define | combinations as arrangements or listings where order is not important | 1 |
| use | the symbol $C(6, 3)$ to represent the number of combinations of 6 things taken 3 at a time | any number |
| observe | ways in which you might use combinations in your daily life | any number |
| list | examples of combinations | any number |
| find | values for problems such as $C(5, 4)$ | any number |
| write | word problems involving combinations | any number |



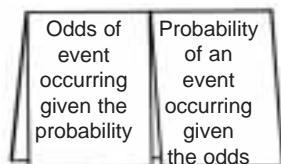
Three-Tab Book



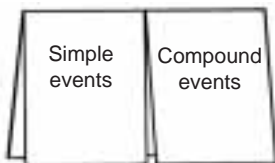
Two-Tab Book



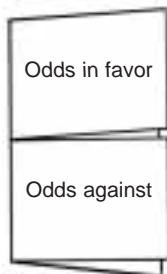
Two-Tab Concept Map



Two-Tab Book



Two-Tab Book



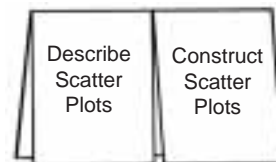
Two-Tab Book

Probability

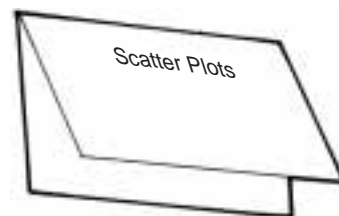
| Skill | Activity Suggestion | Foldable Parts |
|----------------------|--|----------------|
| define | probability as the chance that some event will happen | 1 |
| describe | probability as the ratio of the number of ways a certain event can occur to the number of possible outcomes | 1 |
| explain | the set of all possible outcomes as the sample space | 1 |
| find | the probability of three simple events | 3 |
| | the probability of two compound events | 2 |
| describe | the probability of two independent events in words and symbols | 2 |
| | the probability of two dependent events in words and symbols | 2 |
| define | the term <i>odds</i> as a way to describe the chance of an event occurring | 1 |
| explain | odds in favor and odds against | 2 |
| | probability of success and failure | 2 |
| differentiate | between probability and odds | 2 |
| give | examples of mutually exclusive events | any number |
| describe | how to find the probability of mutually exclusive events in words and symbols | 2 |
| define | inclusive events and give two examples | 2 |
| describe | how to find the probability of inclusive events in words and symbols | 2 |
| compare and contrast | mutually exclusive and inclusive events | 2 |
| | dependent and independent events | 2 |
| make | a vocabulary book for the following terms: dependent events, experimental probability, inclusive, independent events, mutually exclusive, odds, relative frequency, simulation | 8 |
| state | the odds of an event occurring given the probability and the probability of an event occurring given the odds | 2 |

Scatter Plots

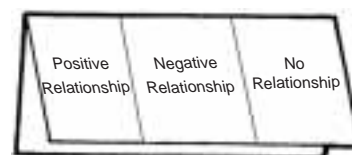
| Skill | Activity Suggestion | Foldable Parts |
|-----------------------|---|----------------|
| define | a scatter plot as a graph that shows the general relationship between two sets of data | 1 |
| construct | scatter plots | any number |
| interpret | scatter plots | any number |
| differentiate between | scatter plots that show a positive relationship, negative relationship, and no relationship | 3 |
| write | about three ways in which scatter plots might be used: display data, examine trends, make predictions | 3 |
| describe | how to draw a scatter plot for two sets of data | 1 |
| create | a scatter plot to analyze data | 1 |
| draw | lines of fit for sets of data on a scatter plot | 1 |
| use | lines of fit to make predictions about data | 1 |
| define | and determine a prediction equation | 2 |



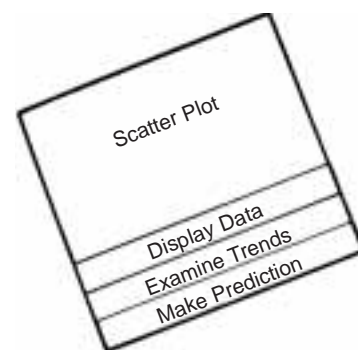
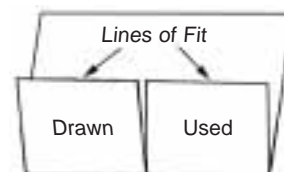
Two-Tab Book



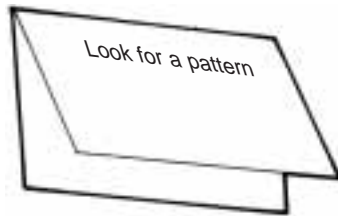
Folded Book



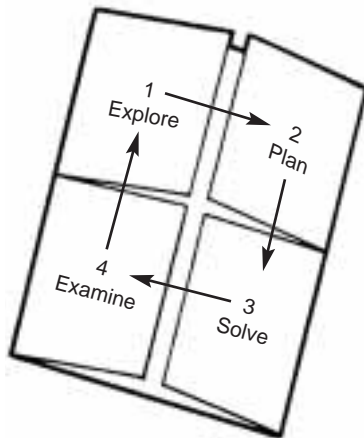
Three-Tab Book


Layered-Look Book
(2 sheets of paper)


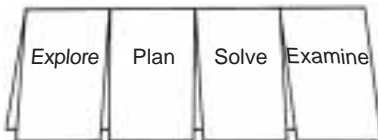
Two-Tab Concept Map



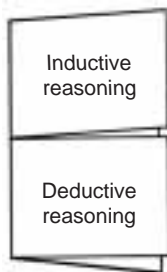
Half Book



Four-Door Book



Four-Tab Book



Two-Tab Book



Folded Chart

Problem-Solving Plan

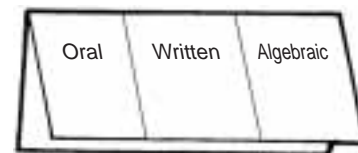
| Skill | Activity Suggestion | Foldable Parts |
|-------------|---|----------------|
| describe | the four steps of the problem-solving plan in writing | 4 |
| solve | problems using the four-step problem-solving plan | any number |
| explain | how the four-step plan gives you an organized method for solving problems | 1 |
| demonstrate | how to use the problem-solving plan | 1 |
| choose | appropriate methods of computation when using the problem-solving plan | 4 |
| describe | how looking for a pattern is a good problem-solving technique | 1 |

Problem-Solving Strategies

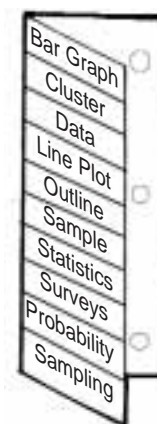
| Skill | Activity Suggestion | Foldable Parts |
|----------------------|---------------------------------------|----------------|
| give | three examples of inductive reasoning | 3 |
| | three examples of deductive reasoning | 3 |
| compare and contrast | inductive and deductive reasoning | 2 |

Vocabulary and Writing Definitions

| Skill | Activity Suggestion | Foldable Parts |
|------------|---|----------------|
| explain | the meaning of a word or process in your own words | 1 |
| define | terms by giving written examples | any number |
| | terms orally, in writing, and algebraically | 3 |
| write | the definition of terms concisely | any number |
| | a descriptive paragraph using the vocabulary words and concepts introduced in a lesson | 1 |
| use | vocabulary words in your speech and writing as frequently as possible | any number |
| | a dictionary to find definitions of your math vocabulary words and compare the dictionary definition to the definition given in your textbook | 2 |
| | the Internet to find definitions and examples of properties, or functions | 3 |
| self-check | your knowledge of terms and concepts by observing a word and mentally defining it | any number |
| quiz | friends and family members to see if they know the meaning of your vocabulary words | any number |



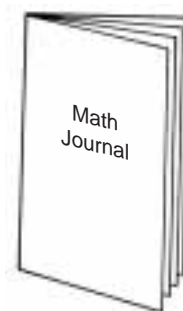
Three-Tab Book



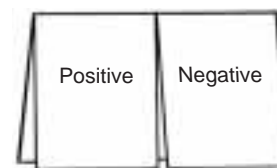
Vocabulary Book

Journals

| Skill | Activity Suggestion | Foldable Parts |
|----------|--|----------------|
| explain | descriptively what you are learning | 1 |
| define | terms, concepts, properties, and more in your math journal | any number |
| write | about personal associations and experiences called to mind during the learning process | any number |
| evaluate | the direction and progress of your learning in your journal | 1 |
| list | examples of ways in which new knowledge has or will be used in daily life experiences | any number |
| read | journal notes of fellow students and compare their experiences with your own | 2 |
| describe | positive and negative experiences during your learning process | 2 |
| use | journals for self-questioning by recording questions that arise during learning | any number |
| | journals to organize thinking by including sketches, diagrams, and examples | any number |



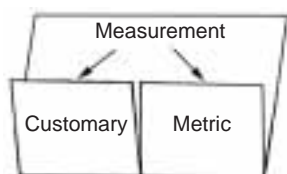
Bound Book



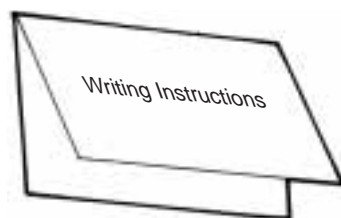
Two-Tab Book



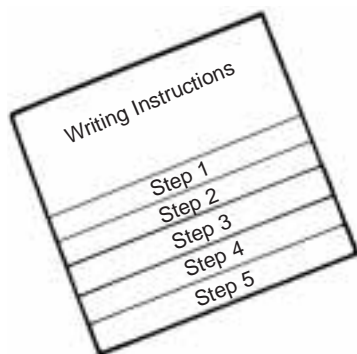
Three-Tab Book



Concept Map



Half Book



Layered-Look Book

Outline, List, and Sequence

| Skill | Activity Suggestion | Foldable Parts |
|----------|--|----------------|
| note | the order in which concepts are presented in lessons and texts | 1 |
| explain | why certain concepts are presented in a specific sequence | 1 |
| | why there is an order of operations | 1 |
| describe | an order of operations as a sequence and describe its importance | 2 |
| outline | the steps used to solve given problems | any number |
| | how several students reached a solution and compare and contrast the outlines | any number |
| | the main ideas and supporting facts presented in a lesson or chapter | any number |
| list | examples of specific things studied, such as operations, processes, properties, and more | any number |

Concept Maps

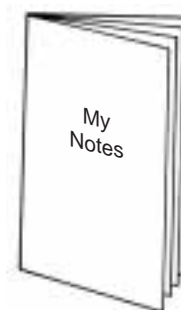
| Skill | Activity Suggestion | Foldable Parts |
|---------|--|----------------|
| explain | the use of a concept map | 1 |
| design | a concept map to organize information presented in a lesson or text chapter | any number |
| use | a concept map as a study guide to review main ideas and supporting information | any number |

Writing Instructions

| Skill | Activity Suggestion | Foldable Parts |
|---------|--|----------------|
| explain | the importance of writing clear, concise instructions | 1 |
| write | a set of instructions on how to do something presented in a lesson | any number |
| ask | students to follow their own instructions to check them for accuracy and clarity | 2 |
| | students to follow instructions written by classmates to check them for accuracy and clarity | 2 |

Main Ideas and Note Taking

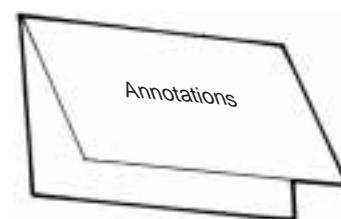
| Skill | Activity Suggestion | Foldable Parts |
|-----------|---|----------------|
| determine | main ideas | any number |
| outline | main ideas and supporting information or facts | any number |
| describe | note taking as a skill that is based upon listening or reading for main ideas and then recording these ideas for future reference | 1 |
| use | a journal to take notes on a specific topic | any number |
| | a concept map to record a main idea and supporting facts | any number |



Bound Book

Annotations

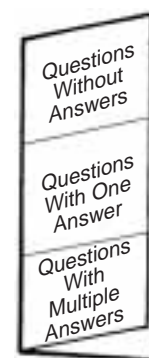
| Skill | Activity Suggestion | Foldable Parts |
|-------|---|----------------|
| write | annotations or notes to organize the text they are reading for review or study | any number |
| write | annotations that include the following: key points highlighted or copied into a journal reader questions that arise reader comments reader reactions to text short summaries steps or data numbered by reader | any number |



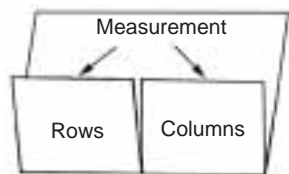
Half Book

Questioning

| Skill | Activity Suggestion | Foldable Parts |
|---------------|---|----------------|
| note | different ways in which questioning is used in the learning process | any number |
| develop | the skill of self questioning during learning | 2 |
| write | personal questions that arise during learning | 1 |
| practice | asking questions in a clear and concise manner | any number |
| differentiate | between questions that can be answered using <i>yes</i> or <i>no</i> responses to those that are open ended | 2 |
| find | examples of the following: questions without answers questions that have only one answer questions with multiple answers | 3 |
| formulate | questions that can be addressed with data and collect, organize, and display data to answer the questions | any number |



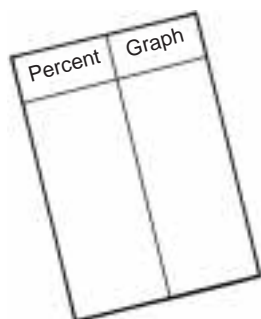
Three-Tab Book



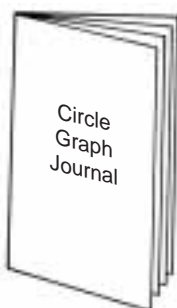
Concept Map



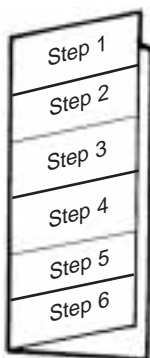
Half Book



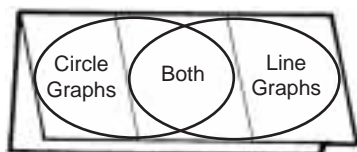
Folded Chart



Bound Book



Six-Tab Book



Venn Diagram

Tables and Charts

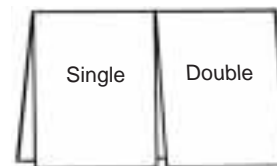
| Skill | Activity Suggestion | Foldable Parts |
|----------|--|----------------|
| chart | information using rows or columns | any number |
| describe | a data table as having rows and columns | 1 |
| | the importance of labeling the title of a data table and labeling the rows and columns | 1 |
| make | a data table | any number |
| outline | steps taken to make a specific data table | any number |
| write | information in the appropriate columns and rows of a data table | any number |
| use | data collected in a table to write a summary | 1 |

Circle Graphs

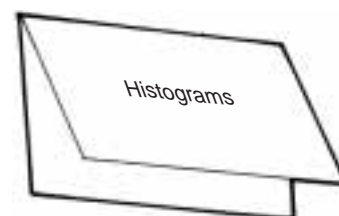
| Skill | Activity Suggestion | Foldable Parts |
|----------------|---|----------------|
| explain | how circle graphs show the parts of something as they relate to the whole | 1 |
| | why circle graphs are also called pie graphs or pie charts | 1 |
| make and label | a circle graph based upon data expressed as percents | 2 |
| | a circle graph based upon data that is not expressed as percents | 2 |
| convert | data into percents and report it using a circle graph | any number |
| describe | each section of a circle graph as a segment of the circle | 2 |
| use | a protractor to measure the central angles of three circle graphs | 1 |
| | a protractor to draw the central angles of three circle graphs | 1 |
| sequence | the steps for converting data into percents so it can be presented using a circle graph | 6 |
| Venn diagram | characteristics of circle graphs, bar graphs, and both | 3 |

Bar Graphs and Histograms

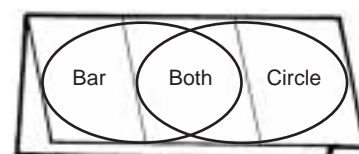
| Skill | Activity Suggestion | Foldable Parts |
|----------------|--|----------------|
| describe | a histogram as a bar graph that shows the frequency distribution of data | 1 |
| make and label | a bar graph | 2 |
| | a histogram | 2 |
| explain | single and double bar graphs | 2 |
| define | a double bar graph as a comparative graph | 1 |
| explain | how a double bar graph can be used to show trends | 1 |
| make and label | a double bar graph | 2 |
| use | a bar graph to compare increases and decreases in quantity over a period of time | 2 |
| collect | examples of bar graphs encountered in daily life | any number |



Two-Tab Book



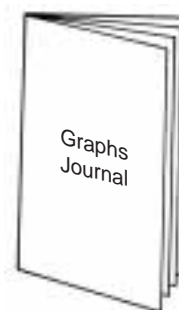
Half Book



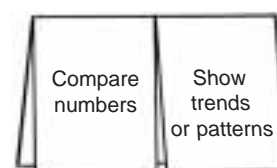
Venn Diagram

Line Graphs

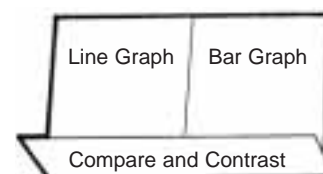
| Skill | Activity Suggestion | Foldable Parts |
|----------------|--|----------------|
| explain | how line graphs can be used to show how values change over a period of time | 1 |
| use | line graphs to compare numbers | any number |
| | line graphs to show trends or patterns | any number |
| develop | a grid and make your own line graph | 1 |
| label | and explain the vertical and horizontal axes of your line graph | 2 |
| describe | which axis shows frequency and which shows categories | 2 |
| | what the points on a line graph indicate and explain why straight lines are used to connect the points | 2 |
| make and label | line graphs to show the following: • student grades over a period of time • production level or sales over time • population of an area over time • income over time | 2 |



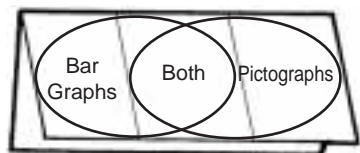
Bound Book



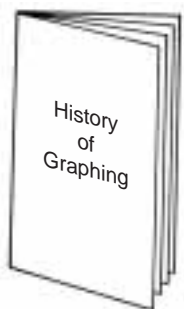
Two-Tab Book



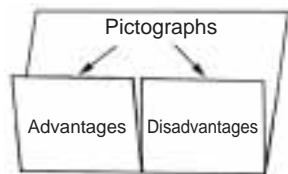
Matchbook



Venn Diagram



Bound Book



Concept Map

Pictographs

| Skill | Activity Suggestion | Foldable Parts |
|----------------------|---|----------------|
| explain | how pictographs use pictures or symbols to show how specific quantities compare | 1 |
| make and label | a pictograph and determine what value each symbol will represent | 2 |
| research | the historic origins of pictographs | 4 |
| compare and contrast | pictographs and bar graphs | 2 |
| collect | examples of pictographs and explain their use | any number |
| list | advantages and disadvantages of using pictographs | 2 |
| note | where and how pictographs are used | 2 |

Venn Diagrams

| Skill | Activity Suggestion | Foldable Parts |
|-----------------------|--|----------------|
| explain | how a Venn diagram can be used to display data and show how the data is related | 2 |
| | how a Venn diagram can be used to find similarities in data | 1 |
| describe | the purpose of a rectangle, circles, and the space formed by overlapping circles in a Venn diagram | 3 |
| differentiate between | using a two circle and a three circle Venn diagram | 2 |
| make | a Venn diagram to display given data and outline the procedure you used | 2 |
| compare and contrast | data presented in a Venn diagram | 2 |
| use | Venn diagrams to illustrate two conditional statements | 2 |
| write | three conditional statements based upon data illustrated by a Venn diagram: If ____, then ____. | 3 |
| draw | a Venn diagram to illustrate data and write four true statements | 4 |

Index

| | | | |
|--------------------------------|-------------------------|------------------------------|---------------------|
| absolute value | .36 | lines | .57 |
| angle relationships | .58 | lines of fit | .83 |
| in polygons | .60 | matrices | .56 |
| angles | .58 | mean | .78 |
| area | .61, 65, 66, 67, 68 | measurement | .75–77 |
| bar graphs | .88, 89, 90 | distance | .76 |
| box-and-whisker plots | .79 | metric | .75 |
| charts | .88 | temperature | .77 |
| circle graphs | .88 | volume | .77 |
| circles | .68 | weight | .76 |
| circumference | .68 | measures of central tendency | .78 |
| combinations | .81 | median | .78 |
| communication | .85–87 | misleading statistics | .78 |
| annotations | .87 | mode | .78 |
| concept maps | .86 | monomials | .53 |
| journals | .85 | multiples | .52 |
| main ideas | .87 | odds | .82 |
| note taking | .97 | order of operations | .46, 54, 86 |
| outline | .86 | parabola | .74 |
| questioning | .87 | parallelograms | .66 |
| sequence | .86 | Pascal's triangle | .80 |
| vocabulary | .85 | percents | .40, 42 |
| writing definitions | .85 | perimeter | .60, 65 |
| cones | .71 | permutations | .81 |
| coordinate geometry | .72 | pi | .44, 68 |
| cylinders | .70 | pictographs | .90 |
| decimals | .39, 41, 42 | planes | .59 |
| deductive reasoning | .84 | points | .57 |
| equations | .48 | polygons | .60 |
| exponents | .54 | polynomials | .53 |
| expressions | .46 | powers | .54 |
| factorization | .51 | prime numbers | .35, 51 |
| factors | .51 | prisms | .70 |
| FOIL | .53 | probability | .82 |
| fractions | .35, 39, 40, 41, 42, 43 | problem solving | .84 |
| frequency tables | .80 | proof | .65, 66 |
| functions | .50 | properties | .35, 39, 47, 48, 49 |
| Fundamental Counting Principle | .80 | proportions | .43 |
| geometry | .57–74 | pyramids | .71 |
| graphing | | Pythagorean theorem | .62 |
| equations | .74 | quadrilaterals | .64, 65, 66, 67 |
| inequalities | .74 | rate of change | .74 |
| on a number line | .36 | rational numbers | .39–41 |
| histograms | .89 | ratios | .43 |
| inductive reasoning | .84 | rays | .57 |
| inequalities | .51 | real number system | .44 |
| integers | .36–38 | rectangles | .65 |
| adding | .37 | reflections | .60 |
| dividing | .38 | relations | .50 |
| multiplying | .38 | rhombi | .65 |
| subtracting | .37 | right triangles | .62, 63 |
| irrational numbers | .44 | rotations | .60 |
| line graphs | .89 | scatter plots | .83 |
| line segments | .57 | scientific notation | .54 |

| | | | |
|-------------------------------|----------------|-------------------------------------|-----------------|
| sequences | .55 | tables | .56, 88 |
| sets | .45 | function | .50 |
| slope | .57, 73, 74 | tessellations | .60 |
| square roots | .44 | three-dimensional figures | .69 |
| squares | .65 | transformations | .60 |
| statistical graphs | .79, 83, 88–90 | translations | .60 |
| bar graph | .89 | trapezoids | .67 |
| circle graph | .88 | triangles | .61 |
| histogram | .89 | right triangles | .62, 63 |
| line graph | .89 | trigonometry | .63 |
| pictograph | .90 | variables | .45 |
| statistics | .78 | Venn diagrams | .90 |
| stem-and-leaf plots | .79 | volume | .69, 70, 71, 77 |
| surface area | .69, 70, 71 | whole numbers | .35 |

