

Correlation of Mathematics: Concepts to the NCTM Standards

STANDARD 1 Number and Operations

Instructional programs should enable all students to:

- ◆ understand numbers, ways of representing numbers, relationships among numbers, and number systems;
- ◆ understand meanings of operations and how they relate to one another;
- ◆ compute fluently and make reasonable estimates.

Mathematics: Concepts

Understand numbers: pages 1–30, 34–64, 68–100, 104–130, 134–170, 174–206, 236–268, 272–279.

Understand meanings: pages 1–27, 68–100, 117–119, 128–129, 134–170, 174–193, 210–219, 236–268, 280–290.

Compute fluently: pages 68–100, 134–170, 174–206, 238–268, 312–313.

Make reasonable estimates: pages 12, 26–27, 53, 95, 111, 161, 185, 204, 221, 257, 265, 283, 301, 345, 378; **Problem-Solving Strategies** on pages 15, 42, 51, 91, 99, 123, 155, 163, 193, 197, 228, 231, 252, 267, 283, 287, 309, 317, 351, 357, 389.

STANDARD 2 Algebra

Instructional programs should enable all students to:

- ◆ understand patterns, relations, and functions;
- ◆ represent and analyze mathematical situations and structures using algebraic symbols;
- ◆ use mathematical models to represent and understand quantitative relationships;
- ◆ analyze change in various contexts.

Mathematics: Concepts

Understand patterns: pages 35, 42, 60–63, 246–249, 250–253, 334.

Represent and analyze: pages 34–64, 212–232.

Use mathematical models: pages 16, 39, 75, 119, 139, 202, 219, 252, 277, 305, 347, 397; and **Application** exercises at the end of each chapter help students to model mathematical situations. See pages 30, 64, 100, 130, 170, 206, 232, 268, 290, 334, 358, 398.

Analyze change: 60–63, 170, 250–253, 315, 317.

STANDARD 3 Geometry

Instructional programs should enable all students to:

- ◆ analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships;
- ◆ specify locations and describe spatial relationships using coordinate geometry and other representational systems;
- ◆ apply transformations and use symmetry to analyze mathematical situations;
- ◆ use visualization, spatial reasoning, and geometric modeling to solve problems.

Mathematics: Concepts

Analyze characteristics: pages 19, 26, 290, 298–321, 324–334.

Specify locations: pages 338–358.

Apply transformations: page 310–313, 348–358.

Use visualization: pages 297, 301, 305, 314, 317, 319, 326–334.

Refer to **Problem Solving** exercises on pages 19, 26, 309, 315, 317, 357. See also **Application** exercises on pages 334, 358,

Math In Your Life on pages 317 and 343, **Technology Connection** on page 333, and **Build a Model** on pages 305 and 347.

STANDARD 4 Measurement

Instructional programs should enable all students to:

- ◆ understand measurable attributes of objects and the units, systems, and processes of measurement;
- ◆ apply appropriate techniques, tools, and formulas to determine measurements.

Mathematics: Concepts

Understand measurable attributes: pages 24–25, 30, 54–55, 80–83, 201–203, 298–333, 379.

Apply appropriate techniques, tools, and formulas: pages 24–25, 30, 38–39, 54–56, 80–83, 182–185, 200–203, 298–318, 322–333, 379.

STANDARD 5 Data Analysis and Probability

Instructional programs should enable all students to:

- ◆ formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them;
- ◆ select and use appropriate statistical methods to analyze data;
- ◆ develop and evaluate inferences and predictions that are based on data;
- ◆ understand and apply basic concepts of probability.

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Formulate questions: pages 362–371, 380–389, 398–401.

Select and use: pages 362–371, 372–389, 398–401.

Develop and evaluate: pages 364–367, 380–389.

Understand and apply: pages 386–397.

STANDARD 6 Problem Solving

Instructional programs should enable all students to:

- ◆ build new mathematical knowledge through problem solving;
- ◆ solve problems that arise in mathematics and in other contexts;
- ◆ apply and adapt a variety of appropriate strategies to solve problems;
- ◆ monitor and reflect on the process of mathematical problem solving.

Mathematics: Concepts

Problem Solving exercises throughout provide students opportunities to apply **problem-solving strategies**. See examples on pages 15, 42, 51, 91, 99, 123, 155, 163, 193, 197, 228, 231, 252, 267, 283, 287, 309, 317, 351, 357, 389. In addition, see **Application** exercises at the end of each chapter on pages 30, 64, 100, 130, 170, 206, 232, 268, 290, 334, 358, 398; **Estimation** activities on pages 12, 26–27, 53, 95, 111, 161, 185, 204, 221, 257, 283, 301, 345, 378; and **Math In Your Life** on pages 25, 49, 82, 125, 159, 197, 226, 241, 282, 317, 331, 343, 367.

STANDARD 7 Reasoning and Proof

Instructional programs should enable all students to:

- ◆ recognize reasoning and proof as fundamental aspects of mathematics;
- ◆ make and investigate mathematical conjectures;
- ◆ develop and evaluate mathematical conjectures;
- ◆ develop and evaluate mathematical arguments and proofs;
- ◆ select and use various types of reasoning and methods of proof.

Mathematics: Concepts

Reasoning skills/processes, conjectures, and argumentation are applied throughout in exercises at the end of each lesson and in **Problem Solving** and **Application** exercises listed above, and in **Chapter Reviews**.

Problem-Solving Strategies: pages 15, 42, 51, 91, 99, 123, 155, 163, 193, 197, 228, 231, 252, 267, 283, 287, 309, 317, 351, 357, 389.

Patterns can be found particularly on pages 35, 60–63, 246–249, 250–253, 334.

STANDARD 8 Communication

Instructional programs should enable all students to:

- ◆ organize and consolidate their mathematical thinking through communication;
- ◆ communicate their mathematical thinking coherently and clearly to peers, teachers, and others;
- ◆ analyze and evaluate the mathematical thinking and strategies of others;
- ◆ use the language of mathematics to express mathematical ideas precisely.

Mathematics: Concepts

Helps students develop **mathematical communication skills** in a number of ways:

— **Oral explanation and discussion:** **Problem Solving** exercises provide opportunity for oral language.

— **Learning Styles: Auditory/Verbal** sidebars in Teacher's Edition.

— **Graphical representations** on pages 6, 8, 74, 140–143, 148–150, 237–245, 254–259, 262–267, 340–357, 365–371, 382–385.

— **Problem-solving strategies** on pages 15, 42, 51, 91, 99, 123, 155, 163, 193, 197, 228, 231, 252, 267, 283, 287, 309, 317, 351, 357, 389.

— **Definitions** of topic-relevant terms are included on the first page of each lesson throughout, used in context and defined in glossary.

— **Power, scientific notation, and exponents** are addressed on pages 10, 76–79, 124–127, 272–290.

STANDARD 9 Connections

Instructional programs should enable all students to:

- ◆ recognize and use connections among mathematical ideas;
- ◆ understand how mathematical ideas interconnect and build on one another to produce a coherent whole;
- ◆ recognize and apply mathematics in contexts outside of mathematics.

Mathematics: Concepts

Relationships among diverse mathematical concepts such as arithmetic, linear equations, percentages, exponents, polynomials, data, fractions, inequalities, irrational numbers, geometry, and quadratic equations are explored throughout, and principles are presented as an integrated whole. In addition, the *role of mathematics in other disciplines* is explored in chapter openers on pages 1, 35, 69, 105, 135, 175, 211, 237, 273, 295, 339, 363; as well as *Problem Solving* exercises on pages 15, 42, 51, 91, 99, 123, 155, 163, 193, 197, 228, 231, 252, 267, 283, 287, 309, 317, 351, 357, 389; *Application* exercises on pages 30, 64, 100, 130, 170, 206, 232, 268, 290, 334, 358, 398; in *Try This* activities on pages 5, 19, 25, 29, 37, 45, 83, 98, 109, 111, 139, 165, 189, 215, 225, 240, 249, 277, 333, 357, 389; in *Writing About Mathematics* features on pages 2, 10, 24, 26, 39, 54, 60, 72, 88, 90, 97, 98, 107, 113, 153, 158, 177, 183, 186, 192, 214, 217, 221, 227, 239, 245, 254, 257, 279, 280, 299, 300, 304, 311, 342, 345, 346, 349, 355, 370, 374, 387, 388; in *Technology Connections* on pages 4, 43, 77, 129, 162, 185, 229, 253, 279, 333, 355, 384; *Math in Your Life* features on pages 25, 49, 82, 125, 159, 197, 226, 241, 282, 317, 331, 343, 367; and in *Estimation Activities* on pages 12, 26–27, 53, 95, 111, 161, 185, 204, 221, 257, 283, 301, 345, 378.

STANDARD 10 Representation

Instructional programs should enable all students to:

- ◆ create and use representations to organize, record, and communicate mathematical ideas;
- ◆ select, apply, and translate among mathematical representations to solve problems;
- ◆ use presentations to model and interpret physical, social, and mathematical phenomena.

Mathematics: Concepts

Many different types of *representations* are used throughout the text in order to maximize *student understanding of concepts and relationships*. See the following examples:

Drawings on pages 297, 301, 305, 314, 317, 319, 326–334;

Problem Solving exercises on pages 19, 27, 309, 317, 357;

Charts/Tables on pages 2, 16, 30, 39, 56–63, 70, 73, 75, 80, 82, 95, 113, 119, 182–183, 266, 306, 323, 365–366, 380–381, 386–388, 397;

Graphs on pages 6, 8, 74, 140–142, 148–150, 236–245, 254–259, 262–266, 340–357, 365–371, 382–385;

Build a Model exercises on pages 16, 39, 75, 119, 139, 202, 219, 252, 277, 305, 347, 397;

Manipulative exercises can be found throughout each chapter in the Teacher's Edition.