

Grades Six-Eight
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Correlations with Oklahoma
Instructional Mathematical Goals and Objectives


Students in the middle grades will expand and deepen their knowledge of numbers, computations, estimation, measurement, geometry, statistics, probability, patterns, functions, and the fundamental concepts of algebra by focusing on meaningful mathematics in each of these areas.

Instruction in the middle grades should include activities in which the students actively work to pose and solve problems both individually and together. Learning tools such as concrete models, fraction manipulatives, algebra tiles, geoboards, calculators and computers are beneficial and should be available to all students.

MATHEMATICS PROCESS STANDARDS

Grades 6-8

The National Council of Teachers of Mathematics (NCTM) had identified five process standards: Problem Solving, Reasoning and Proof, Communication, Connections, and Representation. Active involvement by students using these processes is likely to broaden mathematical understandings and lead to increasingly sophisticated abilities required to meet mathematical challenges in meaningful ways.

The reference **THINK STAR**  will be made throughout this document to the image of a five-point star with content at its center and the five process standards at each point. The signals that mathematics curriculum should integrate some or all of the process skills into content-centered lessons. Following is an outline of the five process standards and associated skills.

I. Problem Solving

- A. Develop and test strategies to solve practical, everyday problems which may have single or multiple answers. **All Appetizers; Main Dish All Objectives; Applications; Final Tests; Reasonableness Problems; Journal Topics**
- B. Use technology to generate and analyze data to solve problems.
- C. Formulate problems from situations within and outside of mathematics and generalize solutions and strategies to new problem situations. **All Appetizers; Main Dish All Objectives; Applications; Final Tests; Reasonableness Problems; Journal Topics**

- D. Evaluate results to determine their reasonableness. **Appetizers 13; Main Dish Objective 13 (Reasonableness); Applications; Final Tests; Reasonableness Problems; Journal Topics**
- E. Apply a variety of strategies (e.g., restate the problem, look for a pattern, diagrams, solve a simpler problem, work backwards, trial and error) to solve problems, with emphasis on multi-step and **non-routine** problems. **All Appetizers; Main Dish All Objectives; Applications; Final Tests; Reasonableness Problems; Journal Topics**
- F. Use oral, written, concrete, pictorial, graphical, and/or algebraic methods to model mathematical situations.

II. Communication

- A. Discuss, interpret, translate (from one to another) and evaluate mathematical ideas (e.g., oral, written, pictorial, concrete, graphical, algebraic). **All Appetizers; Main Dish All Objectives; Applications; Final Tests; Reasonableness Problems; Journal Topics**
- B. Reflect on and justify reasoning in mathematical problem-solving (e.g., convenience, demonstrate, formulate). **All Appetizers; Main Dish All Objectives; Applications; Final Tests; Reasonableness Problems; Journal Topics**
- C. Select and use appropriate terminology when discussing mathematical concepts and ideas. **All Appetizers; Main Dish All Objectives; Applications; Final Tests; Reasonableness Problems; Journal Topics**

III. Reasoning

- A. Identify and extend patterns and use experiences and observations to make **suppositions**. **All Appetizers; Main Dish All Objectives; Applications; Final Tests; Reasonableness Problems; Journal Topics**
- B. Use counter examples to disprove **suppositions** (e.g., all squares are rectangles, but are all rectangles squares?). **All Appetizers; Main Dish All Objectives; Applications; Final Tests; Reasonableness Problems; Journal Topics**
- C. Develop and evaluate mathematical arguments (e.g., agree or disagree with the reasoning of other classmates and explain why). **All Appetizers; Main Dish All Objectives; Applications; Final Tests; Reasonableness Problems; Journal Topics**
- D. Select and use various types of reasoning (e.g., **recursive** [loops], inductive [specific to general], deductive [general to specific], spatial, and proportional). **All Appetizers; Main Dish All Objectives; Applications; Final Tests; Reasonableness Problems; Journal Topics**

IV. **Connections**

- A. Apply mathematical strategies to solve problems that arise from other disciplines and the real world. **All Appetizers; Main Dish All Objectives; Applications; Final Tests; Reasonableness Problems; Journal Topics**
- B. Connect one area or idea of mathematics to another (e.g., relate equivalent number representations to each other, relate experiences with geometric shapes to understanding **ratio** and **proportion**). **All Appetizers; Main Dish All Objectives; Applications; Final Tests; Reasonableness Problems; Journal Topics**

V. **Representations**

- A. Use a variety of representations to organize and record data (e.g., use concrete, pictorial, and symbolic representations). **Appetizers 2 B; 5 B; 12 B; Main Dish Objective 2 (Mathematical Relations) Lesson 2; Objective 5 (Probability/Statistics) Lesson 2; Objective 12 (Mathematical Representation) Lesson 2; Applications; Final Tests; Reasonableness Problems; Journal Topics**
- B. Use representations to promote the communication of mathematical ideas (e.g., number lines, rectangular coordinate systems, scales to illustrate the balance of equations). **Appetizers 2 A, B, C, D, E, and F; Main Dish Objective 2 (Mathematical Relations) Lessons 1, 2, 3, 4, 5, and 6; Applications; Final Tests; Reasonableness Problems; Journal Topics**
- C. Develop a variety of mathematical representations that can be used flexibly and appropriately (e.g., base-10 blocks to represent fractions and decimals, appropriate graphs to represent data). **All Appetizers; Main Dish All Objectives; Applications; Final Tests; Reasonableness Problems; Journal Topics**
- D. Use a variety of representations to model and solve physical, social, and mathematical problems (e.g., geometric objects, pictures, charts, tables, graphs). **All Appetizers; Main Dish All Objectives; Applications; Final Tests; Reasonableness Problems; Journal Topics**