PROCESS STANDARDS
Process Standards

Problem Solving

- Recognize and formulate problems
- Determine the sufficiency and consistency of data
- Use strategies, data, models and relevant mathematics
- Generate, extend and modify procedures
- Use reasoning (spatial, inductive, deductive, statistical, or proportional) in new settings
- Use accumulated knowledge of mathematics in new situations
- Connects all mathematical knowledge of concepts, procedures, reasoning, and communication skills in confronting new situations
- Judge the reasonableness and correctness of solutions

Use reasoning (spatial, inductive, deductive, statistical, or proportional) in new settings
Process Standards

Reasoning

- Make and investigate mathematical conjectures
  - Major pathway to discovery
  - Investigate using concrete materials, calculators, other tools, and mathematical representations and symbols
  - Revisit to see if they still hold in new settings
  - "Why does this work?"
  - Draw on other mathematical results
  - Learn to articulate the reasoning

- Develop and evaluate mathematical arguments

- Select and use various types of reasoning
  - Algebraic reasoning
  - Geometric reasoning
  - Proportional reasoning
  - Probabilistic reasoning
  - Statistical reasoning

- Clear, concise communication of mathematical ideas appropriate to the students's grade level is most important

Fundamental aspect of mathematics

- Assertions should always have reasons
- Found in all content areas and at all grade levels
Process Standards

- Organize and consolidate mathematical thinking
  - Ideas become meaningful, permanent objects of reflection, refinement, discussion, and amendment
  - Insights are gained

- Reflect and communicate are intertwined processes in mathematics learning

- Communicate mathematical thinking coherently and clearly to others
  - Teachers must build a communication-rich environment
  - Nurture written communication
  - Provide opportunities to test ideas on the basis of shared knowledge in the mathematical community of the classroom

- Analyze and evaluate the mathematical thinking and strategies of others
  - Examine and discuss exemplary and problematic prompts
  - Question and probe one another’s thinking to clarify ideas
  - Examine the methods and ideas of others in order to determine their strengths and limitations

- Use the language of mathematics to express mathematical ideas precisely
  - Use the language of mathematics to express mathematical ideas precisely
  - Build a connection from everyday, familiar language to the power and precision of mathematical language

- Use the language of mathematics to express mathematical ideas precisely
  - Technology affords challenges and opportunities for the development of language

- Use the language of mathematics to express mathematical ideas precisely
Connections

Recognize and use connections among mathematical ideas

- Belief that mathematical ideas are connected should permeate the school mathematics experience at all levels
- New ideas are seen as extensions of previously learned mathematics
- Understand how mathematical ideas interconnect and build on one another to produce a coherent whole
- Integration of procedures and concepts should be central in school mathematics
- Ability to see the same mathematical structure in seemingly different settings should increase

Recognize and apply mathematics in contexts outside of mathematics

- Build confidence to use connections in solving mathematical problems
- Understanding is deeper and more lasting
- Provide opportunities to experience mathematics in a context

Data analysis and statistics are useful in helping students clarify issues related to their personal lives

Understanding is deeper and more lasting
Process Standards

Help make mathematical ideas more concrete and available for reflection

Need to work at developing understandings of the complex ideas captured in conventional representations

The ways in which mathematical ideas are represented is fundamental to how people can understand and use those ideas

Use of representations should grow through the years

Technological tools allow higher level explorations of repetitive models

Create and use representations to organize, record, and communicate mathematical ideas

Select, apply, and translate among mathematical representations to solve problems

Need a variety of representations that support understanding

Use representations to model and interpret physical, social, and mathematical phenomena

Reflect on use of representations to develop an understanding of strengths and weaknesses

Models allow a view of real-world problems

Technological tools change and expand sets of representations