NCTM Principles and Standards for School Mathematics K-12

Main aims:
- Common Curriculum leads to common goals.
- High quality mathematics education for all

Principles
1. Equity
2. Curriculum – coherence; not a collection of activities
3. Teaching – understanding students, challenging and supporting
4. Learning – Building new knowledge from experience and prior knowledge
5. Assessment – should support learning; focus on important mathematics; supply useful feedback to teachers and students
6. Technology – influence and enhance learning
Reform has led to change in Principles
- Representation
- Generalization and Abstraction

Standards

Content Standards – Changing emphasis (p.30)

1. Number and Operations
2. Algebra
3. Geometry
4. Measurement
5. Data Analysis and Probability

Process Standards

1. Problem-Solving
2. Reasoning and Proof
3. Communication
4. Connections
5. Representation
Addition of Discrete Math to the 1989 Curriculum and Evaluation Document

Summary

1. Number and Operations
   - Different ways of representing numbers
   - Number systems
   - Meanings of operations
   - Computations and estimations, e.g. \( \frac{11}{13} + \frac{7}{8} \)

2. Algebra
   - Understanding patterns, relationships, functions
   - Represent and analyze mathematical situations
   - Use of algebraic symbols
   - Use of mathematical models
   - Understand quantitative relationships
   - Analyze change in various contexts
3. Geometry
   - Analyze characteristics and properties of 2d/3d shapes
   - Develop arguments about geometric relationships e.g. Congruence
   - Spatial relationships using co-ordinate systems
   - Transformations and symmetry to analyze
   - Use visualization and spatial reasoning and geometric modeling to solve problems, e.g. dynamic geometry

4. Measurement
   - Measurable attributes
   - Units, systems, processes, e.g. angle, temperature, volume
   - Apply techniques, tools and formulas to determine measurement, e.g. estimation
5. Data Analysis and Probability
- Address data related questions
- Collect, organize and display
- Select and use statistical methods
- Develop and evaluate basic concepts of probability

6. Problem-Solving
- Build new mathematical knowledge
- Solve problems in other contexts
- Apply and adopt many strategies
- Monitor and reflect

7. Reasoning and Proof
- Recognize them as fundamental
- Make and investigate conjectures
- Develop arguments and proof
- Selecting and using a variety of proofs
8. Communication
   - Organize and consolidate thinking
   - Communicate coherent thinking to peers and teachers
   - Analyze and evaluate thinking of others
   - Use of mathematical language

9. Connections
   - Understand how mathematical ideas interact
   - Building of ideas
   - Application of mathematics in other contexts, e.g. data analysis

10. Representation
    - Organize and record, communicate mathematical ideas
    - Select, apply and translate among mathematical representations (e.g. use of arrays to help understand commutativity)
    - Use of representations to model and interpret social phenomena