

# National Council of Teachers of Mathematics' Standards for School Mathematics: Pre-K to 12

Instructional programs from **Pre-K to 12** should enable all students to:

## **Number and Operations Standard:**

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

## **Measurement Standard:**

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

## **Geometry Standard:**

- 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; and use visualization, spatial reasoning, and geometric modeling to solve problems.

## **Algebra Standard:**

- Understand patterns, relations, and functions;  
\* from *Principles and Standards for School Mathematics*
- Represent and analyze mathematical situations and structures using algebraic symbols;
- Use mathematical models to represent and understand quantitative relationships; and
- Analyze change in various contexts.

## **Data Analysis and Probability:**

- 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; and
- Understand and apply basic concepts of probability.

## **Process Standards:**

Instructional programs for **Pre-K to 12** should enable students to –

### **Problem Solving Standard:**

- 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; and
- Monitor and reflect on the process of mathematical problem solving

### **Reasoning and Proof Standard:**

- Recognize reasoning and proof as fundamental aspects of mathematics;  
make and investigate mathematical conjectures;
- Develop and evaluate mathematical arguments and proofs; and
- Select and use various types of reasoning and methods of proof.

### **Communication Standard:**

- 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; and
- Use the language of mathematics to express mathematical ideas precisely.

### **Connections Standard:**

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

### **Representation Standard:**

- Create and use representations to organize, record, and communicate mathematical ideas;
- Select, apply and translate among mathematical representations to solve problems; and
- Use representations to model and interpret physical, social, and mathematical phenomena.

Reference: <http://standards.nctm.org/>

Reference: <http://standards.nctm.org/document/index.htm>

Reference: <http://www.ode.state.oh.us/GD/Templates/Pages/ODE/ODEDefaultPage.aspx>