

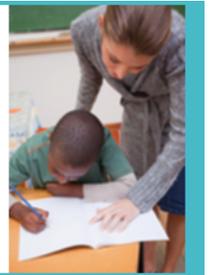


San Diego | February 3–4, 2017

Effective Teaching with *Principles to Actions*: Implementing College- and Career-Readiness Standards

NCTM INTERACTIVE INSTITUTES

Grades PK–5 | Grades 6–8 | Grades 9–12 | School Leaders



Session 1

Grades 6-7

Ratio and Proportion

Ratio and proportion concepts are central to the middle grades curriculum. We will use and connect different mathematical representations (e.g., graphs, tables, symbols, double number lines, tape diagrams) to support students' understanding of ratio and proportion. We will consider ways to help students develop conceptual understanding of ratio, constant of proportionality (unit rates), and proportional relationships.

Grade 8

Functions: Expressing relationships between two quantities

Develop the concept of function by building on previous knowledge of ratio and proportion. We will use tasks to create graphs of proportional relationships; differentiate and find similarities between direct proportional variations and all linear functions; apply concepts and algebra skills about expressions and equations to describe functions. Additionally, one task will use data collection and scatterplots to make a connection between functions and statistics.

Session 2

Grades 6-7

Expressions and Equations

How does students' prior work in arithmetic connect to their work with algebraic expressions? How are variables used to represent real-world quantities? We will explore ways to elicit sixth- and seventh-grade students' current understandings of expressions and equations; help them make connections among arithmetic, geometry, and algebra; and develop their capacity to create and analyze methods for solving equations by using reasoning. Looking at meaningful mathematical discourse and posing purposeful questions will be important components of this session.

Grade 8

Expressions, Equations, and Number

By using problem contexts, we will consider how the expressions and equations standards and the number standards progress from the standards in previous grade levels. Our tasks will include using irrational numbers and the Pythagorean theorem, as well as finding equivalent expressions. Samples of student work will be used to explore ways to facilitate student discussion and discourse.

Session 3

Grade 6

Data and Probability: Exploring Univariate Data

We will collect and use data to explore measures of center (mean, median, and mode) and measures of dispersion (range and interquartile spread). Additionally, we will create and interpret different graphical displays of data. Setting mathematical goals and selecting tasks to support these goals will be important components of this session.

Grades 7-8

Geometry

We will use area and volume as well as dilations to connect geometry and similarity with ratio and proportion. Our overview of geometry will also focus on rigid transformations (translations, reflections, and rotations) to consider perimeter, angle measure, and congruence. Setting mathematical goals and selecting tasks to support these goals will be important components of this session.

Session 4

Grades 6 & 8

Eliciting, Supporting, and Using Student Thinking and Promoting Productive Struggle

We will consider how to support students' engagement in productive struggle by carrying out a task, watching a video clip, and examining students' written work. We will also use these materials to consider methods for eliciting and using evidence of student thinking.

Grade 7

Data and Probability: How Likely is it?

We will focus on investigating chance processes and using probability models by exploring tasks that facilitate understanding of theoretical and experimental probabilities, and use organized lists, tables, tree diagrams, and simulation to find probabilities of simple and compound events. Establishing mathematics goals to focus learning and implementing tasks that promote reasoning and problem solving will be important components of this session.

Session 5

Grades 6-8

Making connections among mathematical representations.

We will carry out the Counting Cubes task to investigate how different representations can be used when problem solving. Then we will watch a video of a class solving the problem to enable us to discuss strategies that help students connect representations to deepen their understanding of the mathematical concepts in the task. The video also demonstrates that the teacher must orchestrate productive student discourse to ensure that students are connecting representations. We will be examining the teacher moves that make that possible.