Algebra

Session 1

Title: Algebra for College and Career Readiness: The Role of Tasks

Description: What should algebra in high school look like to prepare students for continuing study of mathematics? Carefully chosen tasks can engage students in the mathematical practices as they learn algebra and at the same time provide opportunities for teachers to engage in the mathematical teaching practices that make a difference in what students learn. This session will focus in particular on the practice related to meaningful mathematical discourse.

Session 2

Title: Connecting Algebraic Concepts though Well-Chosen Tasks

Description: Some mathematics problems can challenge students to think about important ideas, invite them to do mathematics, and elicit different strategies that use different levels of mathematics. In working through such a problem, participants will consider the need for students to make explicit the assumptions that they use in solving the problem, publicly acknowledging and validating different approaches in a deliberate, systematic discussion. Participants will continue to focus on the nature of meaningful mathematical discourse, in particular with respect to whole-group discussions.

Geometry

Session 1

Title: Connecting Algebra and Geometry through Coordinates: Transforming Lines to Make Polygons

Description: Participants will analyze the effects of transformations on lines and the resulting polygons. They will look for and make use of mathematical structure to relate this task to mathematical content that students will encounter in the future. Slopes of lines, translations, reflections, rotations, systems of equations, and relationships in special right triangles will be discussed. Participants will engage in a rich task that makes connections between algebra 1 and geometry. The mathematics teaching practices from *Principles to Actions* will be discussed, with an emphasis on facilitating meaningful mathematical discourse.

Session 2

Title: Using Transformations to Make Connections between Polygons and Circles: Linking College- and Career-Readiness Standards to Effective Mathematical Teaching Practices

Description: This session will build on the previous one and will focus on the use of dilations to help students understand similarity. Teachers will explore modeling right triangle similarity by graphing linear equations. A regular hexagon will be constructed (and proved) with the use of compasses and dynamic geometry software, and connections will be made between geometric constructions and polygons graphed in the coordinate plane. Explicit connections will be made to the regular polygons discussed on day 1, and strategies to facilitate mathematical discourse with be explored.

Algebra 2

Session 1

Title: Using Cubes to Strengthen Understanding of Polynomial Patterns

Description: Participants will work with the patterns that emerge from working with different-sized cubes to generate polynomial expressions and relate quadratics to cubics. To help participants think about supporting students for college and career readiness, the session will focus particularly on the Mathematics Teaching Practice "Facilitate meaningful mathematical discourse" from *Principles to Actions*. Participants will explore the question, What does meaningful mathematical discussion look like?

Session 2

Title: Using Data to Motivate Fundamental Mathematical Concepts

Description: Participants will work on a large-group task to organize data in a linear fashion, and this work will lead to understanding the need for using exponents for representation and the logarithmic scale. Participants will have the opportunity to explore other scales as well. To help participants think about supporting students for college and career readiness, the session will give particular attention to the Mathematics Teaching Practice "Facilitate meaningful mathematical discourse" from *Principles to Actions*. What can teachers do to support meaningful mathematical discourse in their classrooms?

Algebra 1, Geometry & Algebra 2

Sessions 3, 4, 5

Title: Mathematical Discourse in the Classroom

Description: Engaging students in meaningful mathematical discourse takes planning. Participants will rotate through three different sessions focusing on deliberate strategies for raising the level of "math talk" and examining norms for student discussions and strategies for structuring student-to-student discourse. The three sessions will use examples from different mathematical domains: Polynomial Representation will focus on connecting polynomials represented symbolically, graphically, and in words; Patterns and Trains will focus on observing and generalizing, in recursive and closed form, patterns generated by creating trains of different-colored blocks; and Mean Absolute Deviation will connect notions of center and spread, beginning with the mean and mean absolute deviation, as a foundation for more formal work with standard deviation.