Modeling Algebra

A Deeper Understanding of Standards and Assessment

CURRICULUM • INSTRUCTION • ASSESSMENT

INSPIRED INSTRUCTION

Agenda

1. Admit Ticket
2. Algebra I Standards/Modeling
3. Connection to Assessment – NJSLA
4. Instructional Strategies
5. Next Steps

Algebra 1 Content Standards
Conceptual Categories: Domains

Number and Quantity
- The Real Number System
- Quantities

Algebra
- Seeing Structure in Expressions
- Arithmetic with Polynomials & Rational Functions
- Creating Equations
- Reasoning with Equations & Inequalities

Functions
- Interpreting Functions
- Building Functions
- Linear, Quadratic, & Exponential Models

Modeling ★

Statistics and Probability
- Interpreting Categorical & Quantitative Data

What Does Modeling Look Like?

✓ **Application**
  - ❑ *Application of the Content Standards in Context*
  - ❑ *Limited or No Prompting*

✓ **Showing Mathematical Process**
  - ❑ *A Representation*

✓ **Manipulatives**
  - ❑ *Allows students to move from Concrete, Representational to the Abstract Stages (Algebra Tiles)*
  - ❑ *Develops a Deeper Understanding*
  - ❑ *Engaging*
  - ❑ *Helps Students Hone their Mathematical Thinking Sills*
  - ❑ *According to Stein & Bovalino (2001) "Manipulatives can be important tools in helping students to think & reason in more meaningful ways"*

LET'S EXPLORE THE STANDARDS

Algebra 1 – Math CCSS –Algebra (A)

Seeing Structure in Expressions	Seeing Structure in Expressions	Arithmetic with Polynomials and Rational Expressions	Creating Equations★
A.SSE.1 Interpret expressions that represent a quantity in terms of its context.★ a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret P(1+r)n as the product of P and a factor not depending on P.* Fluency Recommendation	**A.SSE.3** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.★ a. Factor a quadratic expression to reveal the zeros of the function it defines. b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. c. Use the properties of exponents to transform expressions for exponential functions. *For example the expression 1.15t can be rewritten as $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.*	**A.APR.1** Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials. Fluency Recommendation	**A.CED.1** Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*
Seeing Structure in Expressions **A.SSE.2** Use the structure of an expression to identify ways to rewrite it. *For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.*		**Arithmetic with Polynomials and Rational Expressions** **A.APR.3** Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.	**Creating Equations★** **A.CED.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
Creating Equations★ **A.CED.3** Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*	**Creating Equations★** **A.CED.4** Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V =IR to highlight resistance R.*	**Reasoning with Equations and Inequalities** **A.REI.1** Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	**Reasoning with Equations and Inequalities** **A.REI.3** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

Activity #1

1. Read and analyze your grade level standard A- CED.4

2. Analyze the NJSLA TYPE I released items. Look at the style of the questions, imbedded vocabulary, distractors and make some observations.

3. What instructional strategies or experiences are needed to insure student success of this standard on NJSLA?

Think, Write, Pair, Share

. The area, A, of a rectangular parking lot is given by the equation $A = 16s^2 + 25$. Jacob knows the area of the parking lot and wants to find s. Solve $A = 16s^2 + 25$ for s.

Enter your answer in the space provided. Enter **only** your answer.

$$s = \square$$

Next Steps

Based on today's workshop, what instructional changes or strategies are needed to ensure that your students are able to demonstrate the depth of understanding needed to master these standards?

Want to Book This Workshop?
Contact Us Today!

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