

A quick guide for evaluating classroom content and practice

In **Model Algebra I**, instructional time should focus on four critical areas:

1.

Developing fluency writing, interpreting and translating among various forms of linear equations and inequalities and using them to solve problems (A)

2.

Interpreting, translating, and analyzing different representations of linear, quadratic, and exponential functions (F)

3.

Becoming facile with algebraic manipulation and using linear, quadratic, and exponential functions to model phenomena (A, F)

4.

Interpreting quantitative and categorical data and models (S)

In a **Model Algebra I** math class, you should observe students engaged with at least one mathematics content and practice standard*:

Mathematical Practices

- Making sense of problems and persevering in solving them
- Reasoning abstractly and quantitatively
- Constructing viable arguments and critiquing the reasoning of others
- Modeling with mathematics
- Using appropriate tools strategically
- Attending to precision
- Looking for and making use of structure
- Looking for and expressing regularity in repeated reasoning

Content Standards

Number and Quantity (N-CN, N-VM)

- Working with radicals and rational exponents
- Using properties of rational and irrational numbers
- Reasoning quantitatively and using units as a way to guide the solution of multi-step problems «

Algebra (A-SSE, A-APR, A-CED, A-REI)

- Interpreting the structure of linear, quadratic, and exponential expressions in context (*terms, factors, coefficients*)
- Writing expressions in equivalent forms to solve problems (*factoring*)
- Performing arithmetic operations on polynomials
- Creating equations (*linear, quadratic, exponential*) that describe numbers or relationships «
- Examining the constraints of linear equations and inequalities «
- Understanding solving equations as a process of reasoning and explaining the reasoning
- Solving linear equations and inequalities in one variable (*absolute value*)
- Solving quadratics (*inspection, factoring, completing the square*)
- Solving systems of equations (*linear and quadratic*)
- Representing and solving equations and inequalities graphically

Functions (F-IF, F-BF, and F-LE)

- Understanding the concept of a function and using function notation (*input/output, domain/range, sequences*)
- Interpreting functions that arise in applications in terms of context (*intercepts, intervals, max/minimums, symmetries, end behavior, domain*) «
- Analyzing functions (*linear, quadratic, piecewise-defined, step, absolute value*) using different representations (*algebraic, graphs*) «
- Calculating and interpreting the average rate of change of a function from tables, equations, and graphs «
- Translating among different representations of functions (*algebraically, graphically, tables, verbal descriptions*)
- Building a function that models a relationship between two quantities «
- Building new functions from existing functions and examining the effect on the graphs of these functions
- Constructing and comparing linear, quadratic, and exponential models and solving problems (*interval, constant rate, growth/decay*) «
- Interpreting expressions for functions in terms of the situation they model (*parameters*)«

Statistics and Probability (S-ID)

- Summarizing, representing, and interpreting data on a single count or measurement variable (*dot plots, histograms, box plots, shape, center, median, mean, spread, interquartile range, standard deviation, outliers*) «
- Summarizing, representing and interpreting data on two categorical and quantitative variables (*scatter plot, fit, residuals*) «
- Interpreting linear models (*slope, intercept, fit, correlation coefficient, correlation/causation*) «

*NOTES

(«) designates a modeling standard

Mathematics What to Look For The example below features three Indicators from the [Standards of Effective Practice](#). These Indicators are just a sampling from the full set of Standards and were chosen because they create a sequence: the educator plans a lesson that sets clear and high **expectations**, the educator then delivers high quality **instruction**, and finally the educator uses a variety of **assessments** to see if students understand the material or if re-teaching is necessary. This example highlights teacher and student behaviors aligned to the three Indicators that you can expect to see in a rigorous Model Algebra 1 math classroom.

Expectations
(Standard II, Indicator E) Plans and implements lessons that set clear and high expectations and also make knowledge accessible for all students.

What is the teacher doing?

- Identifying a lesson's standards or objectives and how they connect to unit goals
- Focusing attention on mathematical language (e.g., linguistic complexity, conventions, and vocabulary)
- Establishing classroom routines that support students to defend their thinking
- Establishing classroom routines that require students to defend their thinking using a logical progression

What are the students doing?

- Persisting when engaging with mathematical tasks
- Using mathematical language precisely to convey meaning and understanding of concepts
- Justifying a solution method using a logical progression of arguments and critiquing the reasoning of others

Instruction
(Standard II, Indicator A) Uses instructional practices that reflect high expectations regarding content and quality of effort and work; engage all students; and are personalized to accommodate diverse learning styles, needs, interests, and levels of readiness.

What is the teacher doing?

- Demonstrating the development of sophisticated mathematical models (e.g., flow charts, formulas)
- Creating a culture of being careful and precise when communicating mathematical ideas
- Highlighting culturally appropriate and effective negotiation skills they observe in students
- Provide students with opportunities to evaluate different approaches to a problem from different perspectives and/or for efficiency

What are the students doing?

- Referencing mathematical elements in context while logically providing claims and counter-claims
- Negotiating with others in response to new ideas, preferences, or contributions
- Actively incorporating others into discussions about mathematical ideas
- Using advanced equations and diagrams to represent patterns

Assessment
(Standard I, Indicator B) Uses a variety of informal and formal methods of assessments to measure student learning, growth, and understanding to develop differentiated and enhanced learning experiences and improve future instruction.

What is the teacher doing?

- Providing actionable feedback to students about their problem solving processes
- Using multiple formative approaches to assess students (e.g., mid-unit assessment, group work)
- Conducting frequent checks for student understanding and adjusting instruction accordingly

What are the students doing?

- Engaging in challenging learning tasks regardless of learning needs (e.g., linguistic background, disability, academic gifts)
- Using drawings, diagrams, and equations to explain mathematical concepts and relationships
- Using exemplars to inform their work