WHAT TO LOOK FOR

A Quick Guide for Observing Classroom Content and Practice Content

Math Advanced
CCRSAE D and E

During an Adult Basic Education (ABE) advanced level Math class, you should observe the teacher integrating the corresponding level CCR Standards and students engaging in a variety of standards and practices:

Operations with Real Numbers (*NS, RP, N.RN, A.APR)	Algebra & Functions (*EE, RP, A.SSE, F.IF, A.REI)	Geometry (*G, G.GMD, G.MG)
• Understand ratio concepts and proportional relationships to solve real world problems including probability. • Fluency with the four operations of real numbers • Use square roots and cube roots in numerical expressions • Use numerical expressions with integer exponents, including numbers expressed in scientific notation	• Solve problems involving rates, ratios, and percentages • Represent a proportional relationship with an equation and use it to solve problems • Rearrange formulas involving (linear), quadratic, exponential, polynomial, and simple rational expressions to highlight specific quantities • Understand the concept of function and use function notation • Solve equations and inequalities in one variable and a system of equations in two variables	• Understand similarity and describe with a sequence of rotations, reflections, translations and dilations • Solve real life and mathematical problems involving angle, measure, area, surface area, and volume of two- and three-dimensional figures • Understand and apply the Pythagorean Theorem • Use new vocabulary and facts about angles to solve problems (supplementary, complementary, vertical, adjacent)
Analysis and Modeling (As a tool for teaching and understanding functions, geometry and statistics; *G, *SP,*F.IF)		
• Interpret differences in shape, center, and spread when comparing data sets • Construct scatter plots for bivariate data • Interpret slope and intercept in terms of a data set in its context • Use a linear or non-linear model to answer questions and solve problems related to data	• Graph proportional relationships by hand, spreadsheet or Desmos, interpreting unit rate as slope and intercept as (0,0) • For nonproportional relationships, understand the effects of slope and intercept • Graph a linear function or inequality to model a situation - by hand, spreadsheet, or Desmos • Analyze and solve linear and pairs of simultaneous equations to model real life situations • Differentiate between and compare situations modeled by linear and exponential functions	• Compare the relationship between the circumference and area of a circle • Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions related to parallel and intersecting lines • Apply geometric concepts in modeling situations

**NS = The Number System; RP = Ratio and Proportional Relationships; N.RN = The Real Number System; Algebra: Arithmetic with Polynomials and Rational Expressions; EE = Expressions and Equations, A.SSE = Algebra: Seeing Structure in Expressions; F.IF = Functions: Interpreting Functions; A.REI = Algebra: Reasoning with Equations and Inequalities G = Geometry; G.GMD Geometry: Geometric Measurement and Dimension; G.MG = Geometry: Modeling with Geometry*

You should also observe all students engaging in **mathematical practices** such as:

- Participating and persevering in solving problems that require deep thinking (DOK), have multiple ways they can be solved or multiple correct solutions, and/or are real-world (messy, require research and decision-making).
- Creating models and analyzing relationships between equations and graphs to draw conclusions.
- Using clear vocabulary and definitions in discussion; explaining their reasoning with correct units or graph labels.

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Practices

The examples below feature several Indicators from the ABE Professional Standards. These Indicators are just a sampling from the full set of the ABE Professional Standards and were chosen because they create a sequence: the teacher plans a lesson that sets clear and high expectations, the teacher then delivers high quality instruction, and finally the teacher uses a variety of assessments to see if students understand the material or if re-teaching is necessary. These examples highlight teacher and student behaviors aligned to these Indicators that you can expect to see in a rigorous ABE advanced level Math class. Click this link to see how these standards look in action before visiting a class.

PLANNING (Indicators P1.1, P1.2, C1.1)	The teacher plans and implements CCRSAE aligned, academically rigorous, differentiated lessons that include clear content and language objectives, set high expectations for all learners, cultivate a safe classroom environment, encourage productive struggle, and motivate all students to succeed.

Useful Virtual/Hands-On Tools: a problem to engage with at arrival; thinking tools (graphing calculator, Desmos, GeoGebra) and materials (graph paper, rulers, spaghetti-lines) accessible to students; non-routine math problems and experiences.

What is the teacher doing?	What are the students doing?
• Demonstrating sophisticated mathematical models (flow charts, formulas, spreadsheets) • Creating or selecting culturally responsive lessons that engage and sustain student attention • Establishing classroom routines that require students to defend their thinking using a logical progression • Focusing attention on mathematical language	• Using mathematical models (computer generated Desmos or GeoGebra), equations, graphs (hand drawn or spreadsheet). • Engaging in challenging learning tasks regardless of learning needs (linguistic and cultural background) • Justifying a solution method using a logical progression of arguments and critiquing the reasoning of others • Using mathematical language precisely to convey meaning

INSTRUCTION (Indicators P1.3, P1.4)	The teacher delivers high quality, culturally responsive instruction that meets the diverse needs of all students and engages them with meaningful topics and tasks that develop students' critical thinking and problem-solving skills.

Useful Virtual/Hands-On Tools: balance scale, algebra tiles, spreadsheets, grid paper, bar models, Desmos calculator, 3-dimensional solid objects.

What is the teacher doing?	What are the students doing?
• Creating a culture of being careful and precise when communicating mathematical ideas. • Highlighting commonalities, differences, and patterns in students' ideas • Providing students with opportunities to evaluate different approaches to a problem	• Negotiating with others in response to new ideas, preferences, or contributions • Referencing mathematical elements in context while logically providing claims and counterclaims • Actively incorporating others into discussions about mathematical ideas, incorporating a variety of approaches

ASSESSMENT (Indicators P2.1, P2.2, P2.3	**The teacher uses a variety of formative and summative assessments to measure student learning and understanding, evaluate the effectiveness of instruction, develop differentiated and advanced learning experiences, and inform future instruction.**

Useful Virtual/Hands-On Tools: exit tickets, journals or logs, My Favorite No, checklists for teacher observation of objectives being demonstrated, or completion of a project

What is the teacher doing?	What are the students doing?
• Prompting students' reasoning; listening to responses to gauge their understanding • Conducting frequent checks for understanding and adjusting instruction accordingly • Using multiple formative approaches to assess students (journals, analyzing group work, student explanation)	• Demonstrating their thinking by drawing, modeling with graphs or equations, and discussing and sharing their work • Incorporating feedback from the teacher and their peers to adjust their thinking • Using drawings, diagrams, graphs, equations, and computer-generated models to show understanding and explain mathematical concepts