

MoSTEP 1.2.1.1: Selected Middle School (5-9) Mathematics Competencies
For: Mild/Moderate Cross-Categorical Special Educators
Approved by MSBE: August 2008

The beginning (pre-service) Mild/Moderate, Cross-Categorical Special Education teacher who chooses mathematics as an area of emphasis will (also) demonstrate knowledge of and/or competency in the following areas of study:

<p>1. Mathematical Processes and Tools: The beginning teacher of mathematics understands mathematical process and tools, and makes these aspects of subject matter meaningful for students. 1997 SSC: 1; CR 1-4, a-h</p>	<p>1.1 use problem solving to investigate and understand mathematical content. (G 1.2, 3.5-6; ACEI 2c; NCTM P1.1.1, M1.1.1, S1.1.1; MAA I.2) 1.2 communicate mathematical ideas in writing and orally, using mathematical language and symbols. (G2.1,4.1; ACEI 2c; NCTM P1.2.1, M1.2.1, S1.2.1; MAA I.2, I.3) 1.5 analyze and articulate connections within mathematics (G 1.6; ACEI 2c; NCTM P1.4.2, M1.4.2, S1.4.2; MAA I.2) 1.10 use calculators and computers as tools to generate multiple representations of mathematical concepts. (ACEI 2c; MAA I.5)</p>
<p>2: Number Operation: The beginning teacher of mathematics understands numbers and their operations and makes these aspects of subject matter meaningful for students. 1997 SSC: 2; CR 1 2, b, c</p>	<p>2.1 understand properties of real and complex numbers, including equivalent representations of numbers (M 1, 5; ACEI 2c; NCTM P2.2.2, M1.6.1, S1.5.1; MAA II.1, III.1, IV.1) 2.2 analyze the effect of and relationships among operations on real and complex numbers. (M.1; ACEI 2c; NCTM P1.5.4; MAA II.1) 2.3 use estimation in working with quantities, measurement, computation, and problem solving. (M.1; ACEI 2c; NCTM P1.5.10; MAA II.1) 2.4 develop, use, model, and explain computational algorithms, including multi-digit calculations involving standard algorithms, fundamental math, and non-standard methods commonly created by students, the reasoning behind the procedures, how the base-10 structure of a number is used in these calculations. (M.1; ACEI 2c; NCTM P1.5.10; MAA II.1) 2.5 understand and apply numerical computation techniques (mental, paper/pencil, calculator) and extend them to algebraic expressions. (M 2; ACEI 2c; NCTM P1.5.3, M1.6.2, S1.5.3)</p>
<p>3: Geometry and Measurement: The beginning teacher of mathematics understands the central concepts, tools of inquiry, and structures of geometry</p>	<p>3.1 understand and apply various systems and tools of measurement and the process of measurement (e.g., understanding the idea of a</p>

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<p>and measurement and makes these aspects of subject matter meaningful for students. 1997 SSC:3; CR 3</p>	<p>unit and the need to select a unit appropriate to the attribute being measured, knowing the standard [English and metric] systems of units, understanding that measurements are approximate and that different units affect precision, comparing units and converting measurements from one unit to another. (M 2; ACEI 2c; NCTM P1.5.5, M1.6.3, S1.5.3)</p> <p>3.3 identify, describe, measure, compare, classify, and represent two- and three-dimensional figures. (M 2; ACEI 2c; MAA II.2)</p>
<p>4: Data Analysis, Probability, and Statistics: The beginning teacher of mathematics understands the central concepts, tools of inquiry, and structures of data analysis, probability, and statistics and makes these aspects of subject matter meaningful for students. 1997 SSC:4; CR e</p>	<p>4.1 collect, organize, and display data in meaningful form(s) by describing data (e.g., understanding shape, spread, and center; using different forms of representation; comparing two sets of data) (M 3, 1.8, 2.1; ACEI 2c; NCTM P1.5.7, M1.6.5, S1.5.5; MAA II.4, III.4, IV.4)</p> <p>4.4 understand the kinds of questions that can be addressed by data, create data sets, and move back and forth between the question (i.e., the purpose of the study) and its design.</p>
<p>5: Patterns, Functions, & Relationships: The beginning teacher of mathematics understands patterns, functions, and relationships and makes these aspects of subject matter meaningful for students. 1997 SSC:5; CR 1-4, a-h</p>	<p>5.1 identify and describe patterns and relationships. (M 4, 1.6; ACEI 2c; NCTM P1.3; MAA II.3)</p> <p>5.2 represent and justify patterns and functions in multiple ways, including reading and creating graphs of functions; reading and creating formulas (in closed and recursive forms) and tables; and understanding the characteristics of particular classes of functions on integers. (M 4, 1.6, 2.2, 3.4; ACEI 2c; NCTM P1.5.9, M1.6.6, S1.5.7; MAA I.3, II.3, IV.3, III.3)</p> <p>5.4 represent and justify general arithmetic claims, using a variety of representations including algebraic notation; understand different forms of argument; and devise deductive arguments.</p>
<p>7: Discrete Mathematics: The beginning teacher of mathematics understands the central concepts, tools of inquiry, and structures of discrete mathematics and makes these aspects of subject matter meaningful for students. 1997 SSC:7; CR 1-4, b, d-f</p>	<p>7.1 use a variety of counting techniques and principles (e.g., permutations and combinations). (M 6; ACEI 2c; NCTM S1.5.10; MAA IV.6)</p> <p>7.2 identify, model, and analyze situations represented by discrete and continuous data. (M 6; ACEI 2c; NCTM P, M, S1.5.10)</p>