

NCTM CAEP Standards (2012) Reviewer Rubrics – Middle Grades (Initial Preparation)

Standard 1: Content Knowledge

Standard 1: Effective teachers of middle grades mathematics demonstrate and apply knowledge of major mathematics concepts, algorithms, procedures, connections, and applications within and among mathematical content domains.

Program evidence of candidates' attainment of Standard 1:

- Assessments are aligned to *NCTM CAEP Mathematics Content for Middle Grades*.
- Assessments, scoring guides/rubrics, and data charts are aligned with standard elements.
- Alignment to standard element(s) is provided within the rubric per criterion.
- Data charts are aligned with an assessment's scoring guide/rubric and report candidate performance by the level (individually scored items) at which it is collected.
- Assessments and scoring guides/rubrics contain discernible levels of performance.
- Assessments are required of all candidates.

Decision Criteria: Attainment of Standard 1 is based on four considerations:

- Two or three years (depending on number of current year program completers) of individual candidate performance data on state-required mathematics content licensure tests aligned to *NCTM CAEP Mathematics Content for Middle Grades* and demonstrating an 80% or better overall pass rate
- At least two additional assessments accompanied by candidates' performance data from a minimum of two applications for an initial report or a minimum of one application for a response to conditions or revised report and selected from:
 - o grades in required mathematics or mathematics education courses demonstrating at least an 80% alignment to each domain of the *NCTM CAEP Mathematics Content for Middle Grades* and overall mathematics GPAs
 - transcript analysis (required for candidates where mathematics or equivalent coursework was not taken at program's institution) that includes course alignment to *NCTM CAEP Mathematics Content for Middle Grades* and course data reported by individual candidate
 - o content-based assessment such as projects, course portfolio, or other course products demonstrating at least an 80% alignment to each domain of the *NCTM CAEP Mathematics Content for Middle Grades* and accompanied by candidates' performance data
- Essential element for Standard 1: 1a
- A preponderance of evidence drawn from the elements
 - o SASB policy defines preponderance of evidence as "an overall confirmation that candidates meet standards in the strength, weight, or quality of evidence," rather than satisfactory performance for each element. A commonly accepted definition of preponderance of evidence is a requirement that more than 50% of the evidence favors a given outcome. NCTM program review decisions are based on the preponderance of evidence at the standard level using this definition. Specifically, more than 50% of the elements of each standard must be met at the acceptable or target level.
 - o Element 1a must be met at the acceptable or target level in order to satisfy the preponderance of evidence for Standard 1.

| NCTM Element | Unacceptable | Acceptable | Target |
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| <p>Preservice teacher candidates:</p> | <p>1. State-required Licensure Test:</p> <ul style="list-style-type: none"> - Less than 80% of candidates pass the assessment - Lack of alignment to <i>NCTM CAEP Mathematics Content for Middle Grades</i> - Less than two or three years (depending on the number of current year program completers) of individual candidate performance data <p>2. Fewer than two additional assessments demonstrating at least an 80% alignment to each domain of the <i>NCTM CAEP Mathematics Content for Middle Grades</i> or assessments provide little or no evidence that middle grades candidates:</p> | <p>1. State-required Licensure Test:</p> <ul style="list-style-type: none"> - At least 80% of candidates pass the assessment - Alignment to <i>NCTM CAEP Mathematics Content for Middle Grades</i> - Two or three years (depending on the number of current year program completers) of individual candidate performance data <p>2. At least two additional assessments demonstrating at least an 80% alignment to each domain of the <i>NCTM CAEP Mathematics Content for Middle Grades</i> provide evidence that middle grades candidates:</p> | <p>1. State-required Licensure Test:</p> <ul style="list-style-type: none"> - 100% of candidates pass the assessment - Alignment to <i>NCTM CAEP Mathematics Content for Middle Grades</i> - Two or three years (depending on the number of current year program completers) of individual candidate performance data <p>2. At least two additional assessments demonstrating at least an 80% alignment to each domain of the <i>NCTM CAEP Mathematics Content for Middle Grades</i> provide evidence that middle grades candidates:</p> |
| <p>Element 1a</p> <p>Demonstrate and apply knowledge of major concepts, algorithms, procedures, applications in varied contexts, and connections within and among mathematical domains (Number, Algebra, Geometry, Trigonometry, Statistics, Probability, and Calculus) as outlined in the <i>NCTM CAEP Mathematics Content for Middle Grades</i>.</p> | <ul style="list-style-type: none"> - Demonstrate knowledge of major concepts, algorithms, and procedures within and among mathematical domains (Number, Algebra, Geometry, Trigonometry, Statistics, Probability, and Calculus) as outlined in the <i>NCTM CAEP Mathematics Content for Middle Grades</i>. - Apply knowledge of major concepts, algorithms, procedures, applications in varied contexts, | <ul style="list-style-type: none"> - Demonstrate knowledge of major concepts, algorithms, and procedures within and among mathematical domains (Number, Algebra, Geometry, Trigonometry, Statistics, Probability, and Calculus) as outlined in the <i>NCTM CAEP Mathematics Content for Middle Grades</i>. - Apply knowledge of major concepts, algorithms, procedures, applications in varied contexts, | <ul style="list-style-type: none"> - Demonstrate knowledge of major concepts, algorithms, and procedures within and among mathematical domains (Number, Algebra, Geometry, Trigonometry, Statistics, Probability, and Calculus) as outlined in the <i>NCTM CAEP Mathematics Content for Middle Grades</i>. - Apply knowledge of major concepts, algorithms, procedures, applications in varied contexts, and connections within and among |

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| | <p>and connections within and among mathematical domains as outlined in the <i>NCTM CAEP Mathematics Content for Middle Grades</i>.</p> <ul style="list-style-type: none"> - Explain how concepts, algorithms, procedures, and applications have developed. | <p>and connections within and among mathematical domains as outlined in the <i>NCTM CAEP Mathematics Content for Middle Grades</i>.</p> <ul style="list-style-type: none"> - Explain how concepts, algorithms, procedures, and applications have developed. | <p>mathematical domains as outlined in the <i>NCTM CAEP Mathematics Content for Middle Grades</i>.</p> <ul style="list-style-type: none"> - Explain how concepts, algorithms, procedures, and applications have developed. - Apply conceptual and procedural knowledge of major concepts, algorithms, and applications in building new knowledge from prior knowledge and experiences. |
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Standard 2: Mathematical Practices

Standard 2: Effective teachers of middle grades mathematics solve problems, represent mathematical ideas, reason, prove, use mathematical models, attend to precision, identify elements of structure, generalize, engage in mathematical communication, and make connections as essential mathematical practices. They understand that these practices intersect with mathematical content and that understanding relies on the ability to demonstrate these practices within and among mathematical domains and in their teaching.

Program evidence of candidates' attainment of Standard 2:

- Assessments, scoring guides/rubrics, and data charts are aligned with standard elements.
- Alignment to standard element(s) is provided within the rubric per criterion.
- Data charts are aligned with an assessment's scoring guide/rubric and report candidate performance by the level (individually scored items) at which it is collected.
- Assessments and scoring guides/rubrics contain discernible levels of performance.
- Assessments are required of all candidates.

Decision Criteria: Attainment of Standard 2 is based on three considerations:

- At least two assessments accompanied by candidates' performance data from a minimum of two applications for an initial report or a minimum of one application for a response to conditions or revised report and selected from:
 - o two or three years (depending on number of current year program completers) of individual candidate performance data on state-required mathematics content licensure tests and demonstrating an 80% or better overall pass rate
 - o grades in required mathematics or mathematics education courses and overall mathematics GPAs
 - transcript analysis (required for candidates where mathematics or equivalent coursework was not taken at program's institution) that includes course alignment to *NCTM CAEP Mathematics Content for Middle Grades* and course data reported by individual candidate
 - o content-based assessment such as projects, student teaching/internship or course portfolio, or other course products and accompanied by candidates' performance data
- Essential elements for Standard 2: 2a and 2b
- A preponderance of evidence drawn from the elements
 - o SASB policy defines preponderance of evidence as "an overall confirmation that candidates meet standards in the strength, weight, or quality of evidence," rather than satisfactory performance for each element. A commonly accepted definition of preponderance of evidence is a requirement that more than 50% of the evidence favors a given outcome. NCTM program review decisions are based on the preponderance of evidence at the standard level using this definition. Specifically, more than 50% of the elements of each standard must be met at the acceptable or target level.
 - o Elements 2a, 2b, and at least 2 additional elements must be met at the acceptable or target level in order to satisfy the preponderance of evidence for Standard 2.

| NCTM Element | Unacceptable | Acceptable | Target |
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| Preservice teacher candidates: | Fewer than two assessments or assessments provide little or no evidence that middle grades | At least two assessments provide evidence that middle grades candidates: | At least two assessments provide evidence that middle grades candidates: |

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| <p>Element 2a</p> <p>Use problem solving to develop conceptual understanding, make sense of a wide variety of problems and persevere in solving them, apply and adapt a variety of strategies in solving problems confronted within the field of mathematics and other contexts, and formulate and test conjectures in order to frame generalizations.</p> | <ul style="list-style-type: none"> - Use problem solving to develop conceptual understanding and to formulate and test generalizations. - Make sense of a wide variety of problems and persevere in solving them. - Apply and adapt a variety of strategies in solving problems confronted within the field of mathematics and other contexts. - Formulate and test conjectures in order to frame generalizations. | <ul style="list-style-type: none"> - Use problem solving to develop conceptual understanding and to formulate and test generalizations. - Make sense of a wide variety of problems and persevere in solving them. - Apply and adapt a variety of strategies in solving problems confronted within the field of mathematics and other contexts. - Formulate and test conjectures in order to frame generalizations. | <ul style="list-style-type: none"> - Use problem solving to develop conceptual understanding and to formulate and test generalizations. - Make sense of a wide variety of problems and persevere in solving them. - Apply and adapt a variety of strategies in solving problems confronted within the field of mathematics and other contexts. - Formulate and test conjectures in order to frame generalizations. - Monitor and reflect on the process of mathematical problem solving. |
| <p>Element 2b</p> <p>Reason abstractly, reflectively, and quantitatively with attention to units, constructing viable arguments and proofs, and critiquing the reasoning of others; represent and model generalizations using mathematics; recognize structure and express regularity in patterns of mathematical reasoning; use multiple representations to model and describe mathematics; and utilize appropriate mathematical vocabulary and symbols to communicate</p> | <ul style="list-style-type: none"> - Reason abstractly, reflectively, and quantitatively with attention to units, constructing viable arguments and proofs, and critiquing the reasoning of others. - Represent and model generalizations using mathematics. - Recognize structure and express regularity in patterns of mathematical reasoning. - Use multiple representations to model and describe mathematics. - Use appropriate mathematical vocabulary and symbols to | <ul style="list-style-type: none"> - Reason abstractly, reflectively, and quantitatively with attention to units, constructing viable arguments and proofs, and critiquing the reasoning of others. - Represent and model generalizations using mathematics. - Recognize structure and express regularity in patterns of mathematical reasoning. - Use multiple representations to model and describe mathematics. - Use appropriate mathematical vocabulary and symbols to | <ul style="list-style-type: none"> - Reason abstractly, reflectively, and quantitatively with attention to units, constructing viable arguments and proofs, and critiquing the reasoning of others. - Represent and model generalizations using mathematics. - Recognize structure and express regularity in patterns of mathematical reasoning. - Use multiple representations to model and describe mathematics. - Use appropriate mathematical vocabulary and symbols to |

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| mathematical ideas to others. | communicate mathematical ideas to others. | communicate mathematical ideas to others. | communicate mathematical ideas to others. - Demonstrate an appreciation for mathematical rigor and inquiry. |
| Element 2c Formulate, represent, analyze, and interpret mathematical models derived from real-world contexts or mathematical problems. | - Formulate, represent, analyze, and interpret mathematical models derived from real-world contexts or mathematical problems. | - Formulate, represent, analyze, and interpret mathematical models derived from real-world contexts or mathematical problems. | - Formulate, represent, analyze, interpret, and validate mathematical models derived from real-world contexts or mathematical problems. - Demonstrate flexibility in mathematical modeling when confronted with different purposes or contexts. |
| Element 2d Organize mathematical thinking and use the language of mathematics to express ideas precisely, both orally and in writing to multiple audiences. | - Organize mathematical thinking. - Use the language of mathematics to express ideas precisely, both orally and in writing to peers, teachers, or students. | - Organize mathematical thinking. - Use the language of mathematics to express ideas precisely, both orally and in writing to peers, teachers, or students. | - Organize mathematical thinking. - Use the language of mathematics to express ideas precisely, both orally and in writing to multiple audiences including peers, teachers, students, school professionals, and/or other stakeholders. |
| Element 2e Demonstrate the interconnectedness of mathematical ideas and how they build on one another and recognize and apply mathematical connections among mathematical ideas and across various content areas and real-world contexts. | - Demonstrate the interconnectedness of mathematical ideas and how they build on one another. - Recognize and apply mathematical connections among mathematical ideas and across various content areas and real-world contexts. | - Demonstrate the interconnectedness of mathematical ideas and how they build on one another. - Recognize and apply mathematical connections among mathematical ideas and across various content areas and real-world contexts. | - Demonstrate the interconnectedness of mathematical ideas and how they build on one another. - Recognize and apply mathematical connections among mathematical ideas and across various content areas and real-world contexts. - Seek opportunities to promote linkages of mathematical ideas in their teaching. |

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| <p>Element 2f</p> <p>Model how the development of mathematical understanding within and among mathematical domains intersects with the mathematical practices of problem solving, reasoning, communicating, connecting, and representing.</p> | <ul style="list-style-type: none"> - Model how the development of mathematical understanding within and among mathematical domains intersects with the mathematical practices of problem solving, reasoning, communicating, connecting, and representing. | <ul style="list-style-type: none"> - Model how the development of mathematical understanding within and among mathematical domains intersects with the mathematical practices of problem solving, reasoning, communicating, connecting, and representing. | <ul style="list-style-type: none"> - Model how the development of mathematical understanding within and among mathematical domains intersects with the mathematical practices of problem solving, reasoning, communicating, connecting, and representing. - Reflect on how the mathematical practices of problem solving, reasoning, communicating, connecting, and representing impact mathematical understanding. |
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Standard 3: Content Pedagogy

Standard 3: Effective teachers of middle grades mathematics apply knowledge of curriculum standards for mathematics and their relationship to student learning within and across mathematical domains. They incorporate research-based mathematical experiences and include multiple instructional strategies and mathematics-specific technological tools in their teaching to develop all students' mathematical understanding and proficiency. They provide students with opportunities to do mathematics – talking about it and connecting it to both theoretical and real-world contexts. They plan, select, implement, interpret, and use formative and summative assessments for monitoring student learning, measuring student mathematical understanding, and informing practice.

Program evidence of candidates' attainment of Standard 3:

- Assessments, scoring guides/rubrics, and data charts are aligned with standard elements.
- Alignment to standard element(s) is provided within the rubric per criterion.
- Data charts are aligned with an assessment's scoring guide/rubric and report candidate performance by the level (individually scored items) at which it is collected.
- Assessments and scoring guides/rubrics contain discernible levels of performance.
- Assessments are required of all candidates.

Decision Criteria:

Attainment of Standard 3 is based on three considerations:

- At least two assessments based on course products or student teaching/internship artifacts such as lesson and/or unit plan(s), student teaching/internship evaluation, or portfolio and accompanied by candidates' performance data from a minimum of two applications for an initial report or a minimum of one application for a response to conditions or revised report
- Essential elements for Standard 3: 3a, 3c, and 3f
- A preponderance of evidence drawn from the elements
 - o SASB policy defines preponderance of evidence as “an overall confirmation that candidates meet standards in the strength, weight, or quality of evidence,” rather than satisfactory performance for each element. A commonly accepted definition of preponderance of evidence is a requirement that more than 50% of the evidence favors a given outcome. NCTM program review decisions are based on the preponderance of evidence at the standard level using this definition. Specifically, more than 50% of the elements of each standard must be met at the acceptable or target level.
 - o Elements 3a, 3c, and 3f and at least 1 additional element must be met at the acceptable or target level in order to satisfy the preponderance of evidence for Standard 3.

| NCTM Element | Unacceptable | Acceptable | Target |
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| Preservice teacher candidates: | Fewer than two assessments or assessments provide little or no evidence that middle grades candidates: | At least two assessments provide evidence that middle grades candidates: | At least two assessments provide evidence that middle grades candidates: |
| Element 3a | - Apply knowledge of mathematics curriculum standards for middle | - Apply knowledge of mathematics curriculum standards for middle | - Apply knowledge of mathematics curriculum standards for middle |

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| <p>Apply knowledge of curriculum standards for middle grades mathematics and their relationship to student learning within and across mathematical domains.</p> | <p>grades within and across mathematical domains.</p> <ul style="list-style-type: none"> - Relate mathematics curriculum standards to student learning. | <p>grades within and across mathematical domains.</p> <ul style="list-style-type: none"> - Relate mathematics curriculum standards to student learning. | <p>grades in their teaching within and across mathematical domains.</p> <ul style="list-style-type: none"> - Relate mathematics curriculum standards to student learning. - Demonstrate how mathematics curriculum standards and learning progressions impact the teaching of middle grades students at different developmental levels. |
| <p>Element 3b</p> <p>Analyze and consider research in planning for and leading students in rich mathematical learning experiences.</p> | <ul style="list-style-type: none"> - Analyze and consider research in planning for mathematics instruction. - Incorporate research-based methods when leading students in rich mathematical learning experiences. | <ul style="list-style-type: none"> - Analyze and consider research in planning for mathematics instruction. - Incorporate research-based methods when leading students in rich mathematical learning experiences. | <ul style="list-style-type: none"> - Analyze and consider research in planning for mathematics instruction. - Incorporate research-based methods when leading students in rich mathematical learning experiences. - Extend their repertoire of research-based instructional methods that address students' diverse learning needs through participation in leadership opportunities such as conferences, use of journals and on-line resources, and engagement with professional organizations. |
| <p>Element 3c</p> <p>Plan lessons and units that incorporate a variety of strategies, differentiated instruction for diverse populations, and mathematics-specific and instructional technologies in building all students' conceptual understanding and procedural</p> | <ul style="list-style-type: none"> - Plan lessons and units that incorporate a variety of strategies. - Plan lessons and units addressing student differences and diverse populations and how these differences influence student learning of mathematics. - Include mathematics-specific and instructional technologies in planned | <ul style="list-style-type: none"> - Plan lessons and units that incorporate a variety of strategies. - Plan lessons and units addressing student differences and diverse populations and how these differences influence student learning of mathematics. - Include mathematics-specific and instructional technologies in planned | <ul style="list-style-type: none"> - Plan lessons and units that incorporate a variety of strategies. - Plan lessons and units addressing student differences and diverse populations and how these differences influence student learning of mathematics. - Include mathematics-specific and instructional technologies in planned |

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| proficiency. | <p>lessons and units.</p> <ul style="list-style-type: none"> - Build all students' conceptual understanding and procedural proficiency in planned lessons and units. | <p>lessons and units.</p> <ul style="list-style-type: none"> - Build all students' conceptual understanding and procedural proficiency in planned lessons and units. | <p>lessons and units.</p> <ul style="list-style-type: none"> - Build all students' conceptual understanding and procedural proficiency in planned lessons and units. - Include in planned lessons and units multiple opportunities and solution avenues for students to demonstrate conceptual understanding and procedural proficiency. |
| <p>Element 3d</p> <p>Provide students with opportunities to communicate about mathematics and make connections among mathematics, other content areas, everyday life, and the workplace.</p> | <ul style="list-style-type: none"> - Design and implement activities and investigations that require communication about mathematics. - Design and implement activities and investigations that foster students making mathematical connections with other content areas, everyday life events, and the workplace. | <ul style="list-style-type: none"> - Design and implement activities and investigations that require communication about mathematics. - Design and implement activities and investigations that foster students making mathematical connections with other content areas, everyday life events, and the workplace. | <ul style="list-style-type: none"> - Design and implement activities and investigations that require communication about mathematics. - Design and implement activities and investigations that foster students making mathematical connections with other content areas, everyday life events, and the workplace. - Encourage students to employ a variety of forms of communication that target varied audiences and purposes across content areas. |
| <p>Element 3e</p> <p>Implement techniques related to student engagement and communication including selecting high quality tasks, guiding mathematical discussions, identifying key mathematical ideas, identifying and addressing student misconceptions, and</p> | <ul style="list-style-type: none"> - Implement techniques for actively engaging students in learning and doing mathematics. - Provide instruction that incorporates high quality tasks and a range of questioning strategies. - Guide productive mathematical discussions in classrooms centered on key mathematical ideas. | <ul style="list-style-type: none"> - Implement techniques for actively engaging students in learning and doing mathematics. - Provide instruction that incorporates high quality tasks and a range of questioning strategies. - Guide productive mathematical discussions in classrooms centered on key mathematical ideas. | <ul style="list-style-type: none"> - Implement techniques for actively engaging students in learning and doing mathematics. - Provide instruction that incorporates high quality tasks and a range of questioning strategies. - Guide productive mathematical discussions in classrooms centered on key mathematical ideas. |

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| <p>employing a range of questioning strategies.</p> | <ul style="list-style-type: none"> - Select and apply instructional techniques that assist in identifying and addressing student misconceptions. - Engage students in communicating about mathematics. | <ul style="list-style-type: none"> - Select and apply instructional techniques that assist in identifying and addressing student misconceptions. - Engage students in communicating about mathematics. | <ul style="list-style-type: none"> - Select and apply instructional techniques that assist in identifying and addressing student misconceptions. - Engage students in communicating about mathematics. - Use students' misconceptions as opportunities for learning. |
| <p>Element 3f</p> <p>Plan, select, implement, interpret, and use formative and summative assessments to inform instruction by reflecting on mathematical proficiencies essential for all students.</p> | <ul style="list-style-type: none"> - Plan, select, and implement formative and summative assessments. - Interpret and use formative and summative assessments to inform instruction by reflecting on mathematical proficiencies essential for all students. | <ul style="list-style-type: none"> - Plan, select, and implement formative and summative assessments. - Interpret and use formative and summative assessments to inform instruction by reflecting on mathematical proficiencies essential for all students. | <ul style="list-style-type: none"> - Plan, select, and implement formative and summative assessments. - Interpret and use formative and summative assessments to inform instruction by reflecting on mathematical proficiencies essential for all students. - Use assessment results for subsequent instructional planning. |
| <p>Element 3g</p> <p>Monitor students' progress, make instructional decisions, and measure students' mathematical understanding and ability using formative and summative assessments.</p> | <ul style="list-style-type: none"> - Use both formative and summative assessment data in making instructional decisions. - Monitor students' progress using a variety of assessment tools that gauge advancement toward stated learning goals. - Use both formative and summative assessments to measure students' mathematical understanding and ability. | <ul style="list-style-type: none"> - Use both formative and summative assessment data in making instructional decisions. - Monitor students' progress using a variety of assessment tools that gauge advancement toward stated learning goals. - Use both formative and summative assessments to measure students' mathematical understanding and ability. | <ul style="list-style-type: none"> - Use both formative and summative assessment data in making instructional decisions. - Monitor students' progress using a variety of assessment tools that gauge advancement toward stated learning goals. - Use, modify, and/or design both formative and summative assessments based upon students' prior knowledge and experiences to measure students' mathematical understanding and ability. |

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| | | | <ul style="list-style-type: none">- Design assessment processes that distinguish among developmental levels of students' mathematical knowledge and skills. |
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Standard 4: Mathematical Learning Environment

Standard 4: Effective teachers of middle grades mathematics exhibit knowledge of pre-adolescent and adolescent learning, development, and behavior. They use this knowledge to plan and create sequential learning opportunities grounded in mathematics education research where students are actively engaged in the mathematics they are learning and building from prior knowledge and skills. They demonstrate a positive disposition toward mathematical practices and learning, include culturally relevant perspectives in teaching, and demonstrate equitable and ethical treatment of and high expectations for all students. They use instructional tools such as manipulatives, digital tools, and virtual resources to enhance learning while recognizing the possible limitations of such tools.

Program evidence of candidates’ attainment of Standard 4:

- Assessments, scoring guides/rubrics, and data charts are aligned with standard elements.
- Alignment to standard element(s) is provided within the rubric per criterion.
- Data charts are aligned with an assessment’s scoring guide/rubric and report candidate performance by the level (individually scored items) at which it is collected.
- Assessments and scoring guides/rubrics contain discernible levels of performance.
- Assessments are required of all candidates.

Decision Criteria:

Attainment of Standard 4 is based on three considerations:

- At least two assessments based on course products or student teaching/internship artifacts such as lesson and/or unit plan(s), student teaching/internship evaluation, or portfolio and accompanied by candidates’ performance data from a minimum of two applications for an initial report or a minimum of one application for a response to conditions or revised report
- Essential elements for Standard 4: 4b, 4d, and 4e
- A preponderance of evidence drawn from the elements
 - o SASB policy defines preponderance of evidence as “an overall confirmation that candidates meet standards in the strength, weight, or quality of evidence,” rather than satisfactory performance for each element. A commonly accepted definition of preponderance of evidence is a requirement that more than 50% of the evidence favors a given outcome. NCTM program review decisions are based on the preponderance of evidence at the standard level using this definition. Specifically, more than 50% of the elements of each standard must be met at the acceptable or target level.
 - o Elements 4b, 4d, and 4e must be met at the acceptable or target level in order to satisfy the preponderance of evidence for Standard 4.

| NCTM Element | Unacceptable | Acceptable | Target |
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| Preservice teacher candidates: | Fewer than two assessments or assessments provide little or no evidence that middle grades candidates: | At least two assessments provide evidence that middle grades candidates: | At least two assessments provide evidence that middle grades candidates: |
| Element 4a Exhibit knowledge of pre- | - Exhibit knowledge of pre-adolescent and adolescent learning, | - Exhibit knowledge of pre-adolescent and adolescent learning, | - Exhibit knowledge of pre-adolescent and adolescent learning, development, |

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| <p>adolescent and adolescent learning, development, and behavior and demonstrate a positive disposition toward mathematical processes and learning.</p> | <p>development, and behavior.</p> <ul style="list-style-type: none"> - Demonstrate a positive disposition toward mathematical processes and learning. | <p>development, and behavior.</p> <ul style="list-style-type: none"> - Demonstrate a positive disposition toward mathematical processes and learning. | <p>and behavior.</p> <ul style="list-style-type: none"> - Demonstrate a positive disposition toward mathematical processes and learning. - Know how students construct knowledge, acquire skills, and develop disciplined thinking processes. |
| <p>Element 4b</p> <p>Plan and create developmentally appropriate, sequential, and challenging learning opportunities grounded in mathematics education research in which students are actively engaged in building new knowledge from prior knowledge and experiences.</p> | <ul style="list-style-type: none"> - Plan and create sequential learning opportunities in which students connect new learning to prior knowledge and experiences. - Create a sequence of developmentally appropriate and challenging learning opportunities grounded in mathematics education research in which students are actively engaged in building new knowledge. | <ul style="list-style-type: none"> - Plan and create sequential learning opportunities in which students connect new learning to prior knowledge and experiences - Create a sequence of developmentally appropriate and challenging learning opportunities grounded in mathematics education research in which students are actively engaged in building new knowledge. | <ul style="list-style-type: none"> - Plan and create sequential learning opportunities in which students connect new learning to prior knowledge and experiences - Create a sequence of developmentally appropriate and challenging learning opportunities grounded in mathematics education research in which students are actively engaged in building new knowledge. - Create a developmentally appropriate and challenging sequence of instruction for all students that shows a progression of learning over time toward proficiency and understanding. |
| <p>Element 4c</p> <p>Incorporate knowledge of individual differences and the cultural and language diversity that exists within classrooms and include culturally relevant perspectives as a means to motivate and engage students.</p> | <ul style="list-style-type: none"> - Incorporate knowledge of individual differences and the cultural and language diversity that exists within classrooms to motivate and engage students. - Include culturally relevant perspectives as a means to motivate and engage students. | <ul style="list-style-type: none"> - Incorporate knowledge of individual differences and the cultural and language diversity that exists within classrooms to motivate and engage students. - Include culturally relevant perspectives as a means to motivate and engage students. | <ul style="list-style-type: none"> - Incorporate knowledge of individual differences and the cultural and language diversity that exists within classrooms to motivate and engage students. - Include culturally relevant perspectives as a means to motivate and engage students. - Access information about and |

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| | | | incorporate resources related to cultural, ethnic, linguistic, gender, and learning differences in their teaching. |
| <p>Element 4d</p> <p>Demonstrate equitable and ethical treatment of and high expectations for all students.</p> | <ul style="list-style-type: none"> - Demonstrate equitable and ethical treatment of all students. - Have high expectations for all students. | <ul style="list-style-type: none"> - Demonstrate equitable and ethical treatment of all students. - Have high expectations for all students. | <ul style="list-style-type: none"> - Demonstrate equitable and ethical treatment of all students. - Have high expectations for all students and persist in helping each student reach his/her full potential. - Demonstrate respect for and responsiveness to the cultural backgrounds and differing perspectives students bring to the classroom. |
| <p>Element 4e</p> <p>Apply mathematical content and pedagogical knowledge to select and use instructional tools such as manipulatives and physical models, drawings, virtual environments, spreadsheets, presentation tools, and mathematics-specific technologies (e.g., graphing tools and interactive geometry software); and make sound decisions about when such tools enhance teaching and learning, recognizing both the insights to be gained and possible limitations of such tools.</p> | <ul style="list-style-type: none"> - Apply mathematical content and pedagogical knowledge to select and use instructional tools such as manipulatives and physical models, drawings, virtual environments, spreadsheets, presentation tools, and mathematics-specific technologies. - Make sound decisions about when instructional tools enhance teaching and learning and recognize both the insights to be gained and possible limitations of such tools. | <ul style="list-style-type: none"> - Apply mathematical content and pedagogical knowledge to select and use instructional tools such as manipulatives and physical models, drawings, virtual environments, spreadsheets, presentation tools, and mathematics-specific technologies. - Make sound decisions about when instructional tools enhance teaching and learning and recognize both the insights to be gained and possible limitations of such tools. | <ul style="list-style-type: none"> - Apply mathematical content and pedagogical knowledge to select and use instructional tools such as manipulatives and physical models, drawings, virtual environments, spreadsheets, presentation tools, and mathematics-specific technologies. - Make sound decisions about when instructional tools enhance teaching and learning and recognize both the insights to be gained and possible limitations of such tools. - Participate in learning opportunities that address current and emerging technologies in support of mathematics learning and teaching. |

Standard 5: Impact on Student Learning

Standard 5: Effective teachers of middle grades mathematics provide evidence demonstrating that as a result of their instruction, middle grades students’ conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and application of major mathematics concepts in varied contexts have increased. These teachers support the continual development of a positive disposition toward mathematics. They show that new student mathematical knowledge has been created as a consequence of their ability to engage students in mathematical experiences that are developmentally appropriate, require active engagement, and include mathematics-specific technology in building new knowledge.

Program evidence of candidates’ attainment of Standard 5:

- Assessments, scoring guides/rubrics, and data charts are aligned with standard elements.
- Alignment to standard element(s) is provided within the rubric per criterion.
- Data charts are aligned with an assessment’s scoring guide/rubric and report candidate performance by the level (individually scored items) at which it is collected.
- Assessments and scoring guides/rubrics contain discernible levels of performance.
- Assessments are required of all candidates.

Decision Criteria:

Attainment of Standard 5 is based on three considerations:

- At least two assessments based on course products or student teaching/internship artifacts such as lesson and/or unit plan(s), student teaching/internship evaluation, or portfolio and accompanied by candidates’ performance data from a minimum of two applications for an initial report or a minimum of one application for a response to conditions or revised report
- Essential element for Standard 5: 5c
- A preponderance of evidence drawn from the elements
 - o SASB policy defines preponderance of evidence as “an overall confirmation that candidates meet standards in the strength, weight, or quality of evidence,” rather than satisfactory performance for each element. A commonly accepted definition of preponderance of evidence is a requirement that more than 50% of the evidence favors a given outcome. NCTM program review decisions are based on the preponderance of evidence at the standard level using this definition. Specifically, more than 50% of the elements of each standard must be met at the acceptable or target level.
 - o Element 5c and at least 1 additional element must be met at the acceptable or target level in order to satisfy the preponderance of evidence for Standard 5.

| NCTM Element | Unacceptable | Acceptable | Target |
|--------------------------------|--|--|---|
| Preservice teacher candidates: | Fewer than two assessments or assessments provide little or no evidence that middle grades candidates: | At least two assessments provide evidence that middle grades candidates: | At least two assessments provide evidence that middle grades candidates: |
| Element 5a | - Verify that middle grades students demonstrate conceptual | - Verify that middle grades students demonstrate conceptual | - Verify that middle grades students demonstrate conceptual understanding |

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| <p>Verify that middle grades students demonstrate conceptual understanding; procedural fluency; the ability to formulate, represent, and solve problems; logical reasoning and continuous reflection on that reasoning; productive disposition toward mathematics; and the application of mathematics in a variety of contexts within major mathematical domains.</p> | <p>understanding and procedural fluency.</p> <ul style="list-style-type: none"> - Verify that middle grades students demonstrate the ability to formulate, represent, and solve problems. - Verify that middle grades students reason logically and reflect on their reasoning. - Verify that middle grades students demonstrate a productive disposition toward mathematics. - Verify that middle grades students apply the mathematics they learn in a variety of contexts within major mathematical domains. | <p>understanding and procedural fluency.</p> <ul style="list-style-type: none"> - Verify that middle grades students demonstrate the ability to formulate, represent, and solve problems. - Verify that middle grades students reason logically and reflect on their reasoning. - Verify that middle grades students demonstrate a productive disposition toward mathematics. - Verify that middle grades students apply the mathematics they learn in a variety of contexts within major mathematical domains. | <p>and procedural fluency.</p> <ul style="list-style-type: none"> - Verify that middle grades students demonstrate the ability to formulate, represent, and solve problems. - Verify that middle grades students reason logically and reflect on their reasoning. - Verify that middle grades students demonstrate a productive disposition toward mathematics. - Verify that middle grades students apply the mathematics they learn in a variety of contexts within major mathematical domains. - Demonstrate sustained and meaningful use of data to inform practice. |
| <p>Element 5b</p> <p>Engage students in developmentally appropriate mathematical activities and investigations that require active engagement and include mathematics-specific technology in building new knowledge.</p> | <ul style="list-style-type: none"> - Engage students in developmentally appropriate mathematical activities and investigations that require active engagement in building new knowledge. - Engage students in developmentally appropriate mathematical activities and investigations that include mathematics-specific technology in building new knowledge. | <ul style="list-style-type: none"> - Engage students in developmentally appropriate mathematical activities and investigations that require active engagement in building new knowledge. - Engage students in developmentally appropriate mathematical activities and investigations that include mathematics-specific technology in building new knowledge. | <ul style="list-style-type: none"> - Engage students in developmentally appropriate mathematical activities and investigations that require active engagement in building new knowledge. - Engage students in developmentally appropriate mathematical activities and investigations that include mathematics-specific technology in building new knowledge. - Facilitate students' ability to develop future inquiries based on current |

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| | | | analyses. |
| <p>Element 5c</p> <p>Collect, organize, analyze, and reflect on diagnostic, formative, and summative assessment evidence and determine the extent to which students' mathematical proficiencies have increased as a result of their instruction.</p> | <ul style="list-style-type: none"> - Collect, organize, analyze, and reflect on diagnostic, formative, and summative assessment data. - Determine the extent to which students' mathematical proficiencies have increased. | <ul style="list-style-type: none"> - Collect, organize, analyze, and reflect on diagnostic, formative, and summative assessment data. - Determine the extent to which students' mathematical proficiencies have increased. | <ul style="list-style-type: none"> - Collect, organize, analyze, and reflect on diagnostic, formative, and summative assessment data. - Determine the extent to which students' mathematical proficiencies have increased. - Use assessment results as a basis for designing and modifying their instruction as a means to meet group and individual needs and increase student performance. |

Standard 6: Professional Knowledge and Skills

Standard 6: Effective teachers of middle grades mathematics are lifelong learners and recognize that learning is often collaborative. They participate in professional development experiences specific to mathematics and mathematics education, draw upon mathematics education research to inform practice, continuously reflect on their practice, and utilize resources from professional mathematics organizations.

Program evidence of candidates' attainment of Standard 6:

- Assessments, scoring guides/rubrics, and data charts are aligned with standard elements.
- Alignment to standard element(s) is provided within the rubric per criterion.
- Data charts are aligned with an assessment's scoring guide/rubric and report candidate performance by the level (individually scored items) at which it is collected.
- Assessments and scoring guides/rubrics contain discernible levels of performance.
- Assessments are required of all candidates.

Decision Criteria:

Attainment of Standard 6 is based on three considerations:

- At least two assessments based on course products or student teaching/internship artifacts such as student teaching/internship evaluation or portfolio and accompanied by candidates' performance data from a minimum of two applications for an initial report or a minimum of one application for a response to conditions or revised report
- Essential element for Standard 6: 6b
- A preponderance of evidence drawn from the elements
 - o SASB policy defines preponderance of evidence as "an overall confirmation that candidates meet standards in the strength, weight, or quality of evidence," rather than satisfactory performance for each element. A commonly accepted definition of preponderance of evidence is a requirement that more than 50% of the evidence favors a given outcome. NCTM program review decisions are based on the preponderance of evidence at the standard level using this definition. Specifically, more than 50% of the elements of each standard must be met at the acceptable or target level.
 - o Element 6b and at least 1 additional element must be met at the acceptable or target level in order to satisfy the preponderance of evidence for Standard 6.

| NCTM Element | Unacceptable | Acceptable | Target |
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| Preservice teacher candidates: | Fewer than two assessments or assessments provide little or no evidence that middle grades candidates: | At least two assessments provide evidence that middle grades candidates: | At least two assessments provide evidence that middle grades candidates: |
| Element 6a Take an active role in their professional growth by | - Participate in professional development experiences that directly relate to the learning and teaching of mathematics. | - Participate in professional development experiences that directly relate to the learning and teaching of mathematics. | - Participate in professional development experiences that directly relate to the learning and teaching of mathematics. |

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| <p>participating in professional development experiences that directly relate to the learning and teaching of mathematics.</p> | | | <p>teaching of mathematics.</p> <ul style="list-style-type: none"> - Incorporate into their teaching new learning acquired from professional development experiences. |
| <p>Element 6b</p> <p>Engage in continuous and collaborative learning that draws upon research in mathematics education to inform practice; enhance learning opportunities for all students' mathematical knowledge development; involve colleagues, other school professionals, families, and various stakeholders; and advance their development as a reflective practitioner.</p> | <ul style="list-style-type: none"> - Engage in continuous and collaborative learning as a means of enhancing students' learning opportunities in mathematics. - Use research in mathematics education to inform practice. - Enhance all students' knowledge of mathematics. - Involve colleagues, other school professionals, families, and various stakeholders in the educational process. - Continue their development as a reflective practitioner. | <ul style="list-style-type: none"> - Engage in continuous and collaborative learning as a means of enhancing students' learning opportunities in mathematics. - Use research in mathematics education to inform practice. - Enhance all students' knowledge of mathematics. - Involve colleagues, other school professionals, families, and various stakeholders in the educational process. - Continue their development as a reflective practitioner. | <ul style="list-style-type: none"> - Engage in continuous and collaborative learning as a means of enhancing students' learning opportunities in mathematics. - Use research in mathematics education to inform practice. - Enhance all students' knowledge of mathematics. - Involve colleagues, other school professionals, families, and various stakeholders in the educational process. - Continue their development as a reflective practitioner. - Use resources, analyses of instruction, and professional development experiences to enhance student learning of mathematics. |
| <p>Element 6c</p> <p>Use resources from professional mathematics education organizations such as print, digital, and virtual resources and collections.</p> | <ul style="list-style-type: none"> - Use resources from professional mathematics education organizations such as print, digital, and virtual resources and collections. | <ul style="list-style-type: none"> - Use resources from professional mathematics education organizations such as print, digital, and virtual resources and collections. | <ul style="list-style-type: none"> - Use resources from professional mathematics education organizations such as print, digital, and virtual resources and collections. - Use research-based resources from professional mathematics education organizations that target positively |

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