

# Are These the Right Standards?

## NCTM NCATE Program Standards Task Force

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# Today's Agenda

- Introductions
- NCATE + TEAC = CAEP
- NCATE NCTM *draft* Standards
- Feedback – today and future
- Questions and Concerns

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# Introductions

## Who are we and who is the NCTM NCATE Program Standards Task Force?

**Francis (Skip) Fennell** (*Chair, NCTM NCATE Voting Rep, Faculty*)

**Barbara Dougherty** (*Board liaison, Faculty*)

**Monique Lynch** (*Staff liaison, NCTM NCATE “SPA Coordinator”*)

**Sue Brown** (*Lead Reviewer, Faculty*)

**Carl Lee** (*Mathematician, Faculty*)

**Judy O’Neal** (*Lead Reviewer, Audit Team member, Faculty*)

**David Pugalee** (*Lead Reviewer, Audit Team member, Faculty*)

**John Staley** (*Public School Mathematics Coordinator/Teacher*)

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# NCATE + TEAC = CAEP

- In October 2010, the National Council for Accreditation of Teacher Education (NCATE) and Teacher Education Accreditation Council (TEAC) Boards voted to consolidate into one Accreditation body called the **Council for Accreditation of Educator Preparation (CAEP)**
- There will be a two-year transition period ending in fall 2012
- Web site: [www.caepsite.org](http://www.caepsite.org)

# NCATE + TEAC = CAEP

## NCATE and TEAC:

- About 700 institutions are NCATE accredited
- About 200 institutions are TEAC accredited
- Approximately 1400 institutions prepare teachers

# NCATE + TEAC = CAEP

## Accreditation (“Unit”) Level Options:

- Continuous Improvement (NCATE)
- Transformation Initiative (NCATE)
- Academic Quality Audit (TEAC)
- Inquiry Brief (TEAC)

# NCATE + TEAC = CAEP

## Program Review Level Options:

- Option 1 – current NCATE process (which offers multiple options) leading to *National Recognition by Specialized Professional Associations (SPAs)*
- Option 2 – new clustered programs process leading to feedback, but *NO* recognition by SPAs
- Option 3 – state-defined process occurring within the state only (no SPA review)

**Note:** All paths to accreditation require program review.

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# NCATE NCTM *Draft* Standards

## New NCATE Guidelines for SPA Standards:

- Standards address Four Principles:
  - Content Knowledge
  - Content Pedagogy
  - Learning Environments
  - Professional Knowledge and Skills
- Maximum of 7 Standards
- Research support/synthesis for standards and SPA's research contributions
- Maximum of a total of 28 Elements (one level below Standard) across all 7 Standards
- Possible 8<sup>th</sup> Standard for unique field experience/student teaching requirements

# NCATE NCTM *Draft* Standards

- NCTM started the revision process in summer 2010
  - Secondary - Initial
  - Middle Grades - Initial
  - Elementary Mathematics Specialist - Advanced
- Draft revised standards will be presented for comment in many venues prior to August 2012
- Final NCTM revised standards will be presented to the NCATE Board for approval in October 2012

# NCATE NCTM *Draft* Standards

- All SPAs are revising standards based on new NCATE Specialty Area Studies Board guidelines to provide some consistency in content and format (a more holistic and narrative approach) across SPAs
- NCTM Standards Task Force was guided by the Content Domains and Mathematical Practices of the **Common Core State Standards for Mathematics** (CCSSO, 2010), with consideration also given to
  - InTASC Model Core Teaching Standards (CCSSO, 2011)
  - Mathematical Preparation of Teachers (CBMS, 2001, 2012)
  - Standards for Elementary Mathematics Specialists (AMTE, 2009)
  - Many others

# NCATE NCTM *Draft* Standards

## Think and write...

- Think about what mathematics content knowledge is needed for a
  - brand new mathematics teacher entering the profession at the secondary or middle level
  - elementary teacher focusing on increasing knowledge of mathematics content, teaching practices, teachers as learners, and leadership
- Jot down keywords or headings for the mathematics content knowledge you identified in your thinking

# NCATE NCTM *Draft* Standards - Secondary

**Standard 1: Number and Algebra (Principle B—  
Content)** Mathematically proficient candidates demonstrate conceptual understanding, procedural fluency, and the application of the following topics in a variety of contexts:

- 1.1 Structure, properties, relationships, and operations on various types of numbers and number systems, including integers, rationals, irrationals, reals, and complex numbers
- 1.2 Multiplicative and other quantitative relationships in problem situations that include ratio, rate, and proportion
- 1.3 Expressions, equations, and inequalities used to describe, interpret, and model relationships

# NCATE NCTM *Draft* Standards - Secondary

**Standard 1: Number and Algebra (Principle B—  
Content)** Mathematically proficient candidates demonstrate conceptual understanding, procedural fluency, and the application of the following topics in a variety of contexts:

1.4 Functions, including linear, quadratic, polynomial, rational, absolute value, exponential, logarithmic, trigonometric, discrete, and continuous, using various representations and notations as a means to describe relationships

1.5 Abstract algebra, including groups, rings, and fields, and linear algebra, including vectors, matrices, and transformations

# NCATE NCTM *Draft* Standards - Secondary

## **Standard 2: Geometry (Principle B—Content)**

Mathematically proficient candidates demonstrate conceptual understanding, procedural fluency, and the application of the following topics in a variety of contexts:

- 2.1 Transformations, congruence, similarity, and trigonometry
- 2.2 Analytic and coordinate geometry
- 2.3 Visualization, representation, and measurement of two- and three-dimensional objects
- 2.4 Geometric constructions and proof

# NCATE NCTM *Draft* Standards - Secondary

**Standard 3: Statistics and Probability (Principle B—Content)** Mathematically proficient candidates demonstrate conceptual understanding, procedural fluency, and the application of the following topics in a variety of contexts:

- 3.1 Design of investigations and the collection, representation, and interpretation of data
- 3.2 Statistical methods to analyze data, make inferences, and justify conclusions
- 3.3 Continuous and discrete probability, conditional probability, and combinatorial techniques

# NCATE NCTM *Draft* Standards - Secondary

## **Standard 4: Calculus (Principle B—Content)**

Mathematically proficient candidates demonstrate conceptual understanding, procedural fluency, and the application of the following topics in a variety of contexts:

- 4.1 Limit, continuity, and the techniques of differentiation and integration
- 4.2 Parametric, polar, and vector functions; sequences and series
- 4.3 Multivariate functions

# NCATE NCTM *Draft* Standards - Secondary

## Back to think and write...

- Were the ideas you wrote down included in the draft standards 1-4?
- What's missing that must be there?
- Is there anything that can be deleted?

# NCATE NCTM *Draft* Standards

## Think and write...

- Think about what content pedagogy (mathematical instructional practice) knowledge and professional knowledge are needed for a brand new teacher entering the profession
- Jot down keywords or headings for the knowledge you identified in your thinking

# NCATE NCTM *Draft* Standards

**Standard 5: Mathematical Practices (Principle C—Instructional Practice)** Candidates demonstrate understanding, proficiency, and application of the following as they affect all students:

## **5.1 Problem Solving:**

- Using problem solving in developing conceptual understanding
- Making sense of a wide variety of problems and persevering in solving them
- Applying and adapting a variety of strategies in solving problems within mathematics and other contexts
- Formulating and testing generalizations

# NCATE NCTM *Draft* Standards

**Standard 5: Mathematical Practices (Principle C—Instructional Practice)** Candidates demonstrate understanding, proficiency, and application of the following as they affect all students:

## 5.2 Reasoning:

- Reasoning abstractly and quantitatively with attention to units, constructing viable arguments, and critiquing the reasoning of others
- Representing and modeling generalizations by using mathematics
- Seeking and expressing regularity in patterns of mathematical reasoning
- Using multiple representations to model and describe mathematics
- Using appropriate mathematical vocabulary and symbols
- Communicating mathematical reasoning to others

# NCATE NCTM *Draft* Standards

**Standard 5: Mathematical Practices (Principle C—Instructional Practice)** Candidates demonstrate understanding, proficiency, and application of the following as they affect all students:

## **5.3 Communication and Engagement:**

- Implementing techniques related to student engagement and communication, including selecting high-quality tasks, identifying student misconceptions, and employing a range of questioning strategies

# NCATE NCTM *Draft* Standards

**Standard 6: Mathematics Teaching and Learning (Principle A—The Learner and Learning and Principle C—Instructional Practice)** Candidates demonstrate understanding, proficiency, and application of the following as they affect all students:

## 6.1 Learning:

- Having an in-depth knowledge of adolescent development and behavior
- Possessing pedagogical knowledge specific to the learning of mathematics that positively affects students' learning and mathematical disposition
- Helping students learn mathematics with understanding by creating learning opportunities and environments in which students are actively engaged in building new knowledge from prior knowledge and experiences

# NCATE NCTM *Draft* Standards

**Standard 6: Mathematics Teaching and Learning (Principle A—The Learner and Learning and Principle C—Instructional Practice)** Candidates demonstrate understanding, proficiency, and application of the following as they affect all students:

**6.2 Planning and Facilitating Instruction:**

- Analyzing and considering research in planning for and leading students in rich mathematical experiences
- Implementing a variety of strategies that meet the needs of all students; planning lessons and units that build students' conceptual understanding and procedural proficiency
- Giving students opportunities to communicate about mathematics
- Making connections among mathematical concepts, other content areas, everyday life, and the workplace
- Incorporating appropriate mathematical tools, including math-specific technologies
- Using instructional plans to facilitate learning when delivering instruction
- Continually reflecting on instructional practice

# NCATE NCTM *Draft* Standards

**Standard 6: Mathematics Teaching and Learning (Principle A—The Learner and Learning and Principle C—Instructional Practice)** Candidates demonstrate understanding, proficiency, and application of the following as they affect all students:

## 6.3 Equity:

- Recognizing the cultural diversity that exists within classrooms
- Valuing the contributions of various cultures in the development of mathematics
- Incorporating the historical development of mathematics and culturally relevant perspectives as tools to engage students

# NCATE NCTM *Draft* Standards

**Standard 6: Mathematics Teaching and Learning (Principle A—The Learner and Learning and Principle C—Instructional Practice)** Candidates demonstrate understanding, proficiency, and application of the following as they affect all students:

## 6.4 Instructional Tools:

- Applying mathematical content and pedagogical knowledge in selecting and using tools such as drawings, diagrams, physical models, manipulatives, websites, Web-based environments, spreadsheets, presentation tools, and mathematics-specific technology, including graphing tools, interactive geometry software, computer algebra systems, statistical packages, and data-collection devices
- Making sound decisions about when the use of tools enhances teaching and learning, recognizing both the insights to be gained and the possible limitations of the tools

# NCATE NCTM *Draft* Standards

**Standard 6: Mathematics Teaching and Learning (Principle A—The Learner and Learning and Principle C—Instructional Practice)** Candidates demonstrate understanding, proficiency, and application of the following as they affect all students:

## **6.5 Assessment:**

- Recognizing that assessment is an integral part of instruction that informs and guides planning and decision making related to whether students achieve both mathematical understanding and procedural proficiency
- Planning and selecting assessments that reflect mathematical knowledge, skills, understanding, and performance that are essential for all students
- Monitoring students' progress, making instructional decisions, and measuring students' mathematical understanding and ability by using both formative and summative assessments

# NCATE NCTM *Draft* Standards

**Standard 7: Professional Knowledge and Skills (Principle D—Professional Responsibility)** Candidates demonstrate commitment to equity, continuous learning, and professional growth:

## 7.1 Professionalism:

- Taking an active role in professional development by participating in educational experiences specific to mathematics and mathematics education
- Engaging in collaborative initiatives that involve colleagues, school professionals, families, and other stakeholders
- Using print and online resources of professional mathematics education organizations

## 7.2 Disposition:

- Demonstrating equitable and ethical treatment of and expectations for all students
- Working collaboratively with others to enhance all students' knowledge of mathematics
- Developing as a reflective practitioner

# NCATE NCTM *Draft* Standards

## **WAIVER REQUEST:**

We plan to request a waiver to allow for an eighth standard addressing field and clinical experiences. NCTM has had a specific requirement for both middle and high school clinical experiences for “secondary” programs that include both middle and high school, and we would like to continue this requirement. Pending approval of this waiver request, Standard 8 will describe this requirement.

# NCATE NCTM *Draft* Standards

## Back to think and write...

- Were the ideas you wrote down included in the draft standards 5-7?
- What's missing that must be there?
- Is there anything that can be deleted?

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# Feedback – Today & Future

- Other than the feedback you already provided, what do you want this Task Force to know as they continue their writing work?

# Feedback – Today & Future

## Feedback Plans:

- Conference sessions (CBMS Forum Fall 2011, NCTM Regionals in Fall 2011, AMTE 2012, etc.)
- Online posting with survey link (draft standards will be posted online with a link to a survey for input) – [www.nctm.org/ncate](http://www.nctm.org/ncate)
- Email messages will request input on the web site
- Other important venues we should consider?

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# Questions and Concerns

What are we missing?

What else do you wonder or worry about related to standards for preservice mathematics teacher education?

# Thanks!

Thank you for attending today!  
We look forward to your ongoing  
input and feedback.

NCTM NCATE Program  
Standards Task Force

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