Course Syllabus

ECED 5830.01	**Topics in Early Learning: Math for the Young Child**	**Summer 2006**
326 Webster Hall **W 5:00-9:00 p.m**	**Dr. Cheryl Breig-Allen** **236 Webster Hall** **961.2660 x 7652** **allencb@webster.edu**	**3 credit hours**

NOTE: The syllabus is subject to change in response to student needs and topics of interest that emerge.

COURSE DESCRIPTION:
Students explore ways to support the young child's construction of knowledge in regard to number. The educational implications of Piaget's theory and related research are examined. The course focuses on children's mathematical learning in pre-kindergarten through third grade.

LEARNING OUTCOMES

Course Outcomes **Students will:**	**Webster University SOE Goals and Dispositions** **ECED MAT Goals**	**NAEYC Standards for Early Childhood Professional Preparation** **Missouri Standards for Teacher Education Programs (MoSTEP)** **NCATE Candidate Proficiencies**
1. Develop the skills of listening to children, observing and documenting their mathematical ideas, actions, words, and work to model reality with the use of mathematical tools. Consider the progression of strategies, the big ideas involved, and the emergent models to be assessed.	**Goals** 2.4 The **informed instructor** employs a variety of formal and informal assessments to monitor learning and modify instruction. **Dispositions** 2.4 listens respectfully to other points of view **ECED MAT Goals** 1. Demonstrate competence as a teacher researcher through ability to observe, document, and analyze children's ideas, learning processes, and actions.	**NAEYC** **Standard 3. Observing, documenting and assessing to support young children and families** 3b Knowing about and using observation, documentation, and other appropriate assessment tools and approaches **MoSTEP** 8.3 Evaluates the effect of class activities on both individual and class as a whole, collecting information through observation of classroom activities, questioning, and analysis of student work

		NCATE Ability to Respond to Diversity Pedagogical Knowledge Professional Knowledge and Skills Impact on PreK-3 Learners
2. Draw upon knowledge of developmental theory, mathematical research, and ongoing study of particular children when organizing the classroom environment to support children as they make meaning of their world by setting up quantifiable and spatial relationships; noticing patterns and transformations; proving them as generalizations; and taking ownership to search for solutions to relevant problems.	**Goals** 1.3 The **knowledgeable learner** identifies developmental factors in student learning; and 1.4 understands theoretical principles of effective instruction to plan learning experiences. 4.2 The **responsive educator** acknowledges social and cultural contexts to create effective teaching and learning environments. **Dispositions** 2.1 understands, respects and responds appropriately to diversity in a variety of settings **ECED MAT Goals** 3. Create a curriculum that is grounded in an understanding of subject matter, developmental theory, and ongoing research.	**NAEYC** **Standard 1. Promoting child development and learning** 1a. Knowing and understanding young children's characteristics and needs 1b. Knowing and understanding multiple influences on development and learning 1c. Using developmental knowledge to create healthy, respectful, and challenging learning environments **MoSTEP** 2.1 Knows and identifies child development 3.4 Connects instruction to student's prior experiences, family, culture and community **NCATE** Ability to Respond to Diversity Pedagogical Knowledge Professional Knowledge and Skills
3. Learn how to support children's mathematical learning in regard to the content areas of language arts, science, social studies, art, music, drama and movement through integrated learning experiences, project studies, and daily living experiences.	**Goals** 1.1 The **knowledgeable learner** knows content that supports conceptual understanding; and 1.2 applies tools of inquiry to construct meaningful learning experiences. 2.1 The **informed instructor** designs curriculum based on students' prior knowledge, learning styles, strengths and needs; and 2.2 uses a variety of communication modes, media, and technology to support student learning.	**NAEYC** **Standard 4. Teaching and Learning** 4b. Using developmentally effective approaches 4c. Understanding content knowledge in early education 4d. Building meaningful curriculum **MoSTEP** 1.5 Creates interdisciplinary learning 2.4 Knows theories of learning 4.1 Selects, creates and plans learning experiences that are appropriate for curriculum goals, relevant to learners, and based upon principles of effective instruction.

	Dispositions 1.2 embraces an openness to change (adaptability, flexibility) **ECED MAT Goals** 2. Apply an interdisciplinary, collaborative, and ecological systems-oriented approach to early education that encourages family and community participation.	7.3 Supports and expands learner expression in speaking, writing, listening and other media **NCATE** Content Knowledge Pedagogical Knowledge Professional Knowledge and Skills Impact on PreK-3 Learners

4. Develop an interest, positive attitude, curiosity and creative thinking about mathematics. Learn how to support autonomy and reciprocity among children as they grapple with mathematical ideas; develop and refine strategies, create mathematical modes; and attempt to understand and construct mathematical concepts.	4.3 The **responsive educator** adapts instruction to the learner's knowledge, ability, and background experience; and 4.4 identifies resources for specialized services when needed. **Dispositions** 2.2 exhibits empathy 3.5 affects change with courage and confidence **ECED MAT Goals** 3. Create a curriculum that is grounded in an understanding of subject matter, developmental theory, and ongoing research.	**NAEYC** **Standard 4. Teaching and Learning** 4a. Knowing understanding and using positive relationships and supportive interactions **MoSTEP** 2.3 Encourages student responsibility 6.2 Manages time, space, transitions and activities effectively 9.1 Applies a variety of problem-solving strategies reflecting on practice, ,influences on student's growth and learning and the complex interactions between them 10.2 Talks with and listens to students, is sensitive and responsive to signs of distress, and seeks appropriate help as needed to solve students' problems **NCATE** Ability to Respond to Diversity Pedagogical Knowledge Professional Knowledge and Skills Impact on PreK-3 Learners Evidence of Dispositions

5. Act as mentors and co-learners who provoke mathematical curiosity, creative and critical thinking, and consider of multiple perspectives among children and adults. Closely examine how children construct their understanding of mathematical concepts and explore elements of a comprehensive mathematics curriculum. Support children to really understand by working out their mathematical ideas thoroughly, explaining relationships to themselves and defending them to others.	4.1 the **responsive educator** understands and responds appropriately to issues of diversity; 4.2 acknowledges social and cultural contexts to create effective tea **Dispositions** 1.3 exhibits curiosity 3.3 communicates and collaborates in university and school cultures 3.4 accepts academic rigor (willingness to work/high expectations) **ECED MAT Goals** 1. Demonstrate competence as a teacher researcher through ability to observe, document, and analyze children's ideas, learning processes, and actions.	**NAEYC** **Standard 1. Promoting Child Development and Learning** 1a, 1b, 1c (see above) **Standard 5. Becoming a Professional** 5d. Integrating knowledgeable, reflective and critical perspectives on early education **MoSTEP** 5.2 Engages students in active learning that promotes the development of critical thinking, problem-solving, and performance capabilities **NCATE** Ability to Respond to Diversity Content Knowledge Pedagogical Knowledge Professional Knowledge and Skills Impact on PreK-3 Learners
6. Examine their personal beliefs about the teaching and learning of mathematics. Based on these beliefs about the teaching –learning process, build a theoretical framework that supports interactions with children, questioning strategies, what ideas to follow, and activities they design or select. Develop skills of observation, documentation and research in order to continuously inform curriculum decisions and teaching responses.	3.1 The **reflective collaborator** values and integrates reflection to grow as a professional; **Dispositions** 1.4 engages in reflection 3.2 practices informed decision-making in university and school cultures **ECED MAT Goals** 3. Create a curriculum that is grounded in an understanding of subject matter, developmental theory, and ongoing research.	**NAEYC** **Standard 5. Becoming a Professional** 5c. Engaging in continuous, collaborative learning to inform practice **MoSTEP** 8.1 Employs a variety of formal and informal assessment techniques (e.g., observations, authentic assessments) 11.2 Applies current research on teaching and learning with technology to plan and deliver developmentally appropriate learning opportunities that integrate a variety of software, applications and learning tools to support he diverse needs of learners

		11.4 Uses technology resources in assessing student learning of subject matter using a variety of assessment techniques to collect and analyze data, to interpret results, and to communicate findings to improve instructional practice and maximize student learning **NCATE** Ability of Utilize Technology Pedagogical Knowledge Professional Knowledge and Skills Impact on PreK-3 Learners
7. Learn how to collaborate with parents as partners in the development, analysis, and implementation of a curriculum that supports risk taking and mathematical dialogue for fostering real investigations and inquiry.	3.2 The reflective collaborator promotes communication and collaboration with colleagues, families and community leaders; 3.3 seeks relationships with families and students to support student learning; and 3.4 initiates change that benefits students and their families. **ECED MAT Goals** 4. Demonstrate professionalism through communication and collaboration with colleagues, families, children and community leaders.	**NAEYC** **Standard 2. Building Family and Community Relationships** 2c. Involving families and communities in their children's development and learning **NCATE** Ability to Respond to Diversity Pedagogical Knowledge Professional Knowledge and Skills Evidence of Dispositions

COURSE REQUIREMENTS

1. Mathematics Learning Center

Students will work in peer groups to design and organize a learning center with at least two activities focusing on each of the **mathematical strands**.

- measurement
- probability and statistics
- geometry
- logical reasoning
- patterns, functions and algebra
- number

for a group of children

- **pre-k-kindergarten** or
- **primary grades** 1-3

Peer groups will make collaborative decisions as to what math materials should be purchased, considering cost as well as purpose. Time for this group work will be integrated into class format and information will be shared with the class on the last day.

Each center will include

- Diagram of organization, management/rotation, and storage. Make sure the procedures for removing, using, and replacing materials are clearly understood by the children.
- Activity Plans
  Title:
  Objective/Skill
  Materials (purchased/include price and description; recycled materials)
  Naturalistic and Informal Activities
  Structured Activities (list procedural steps)
- Six (at least) children's books that support learning of specific math concepts
  Write a description of each one and tell how it would be used with children.
- Six (at least) math finger plays, songs and or rhymes
- Technology/computer software suggestions with reviews and evaluations
- Learning games
  Design a math game utilizing developmentally appropriate methods of introducing math concepts. The games should be flexible so they can continue to support children's growing math skills and be used with different age groups.
- Assessment Strategy (How will you evaluate proficiency level and by what means?)
- Instructional Resource (books, journal articles, internet websites and catalogs)

2. Center Reflection Paper

Students will submit a reflection paper using the following framework to reflect upon their work with the peer group. Resources (text, articles, videos) from class and outside research will be integrated throughout the paper. Papers will be evaluated in terms of the quality of thought, organization, and integration of resources. Final drafts of individual papers will be brought to class for peer review.

Reflection Paper Framework

Goals/Hypotheses/Questions:

- What do you intend for children to learn? What will they gain from this experience?;
- What questions do you have about children's learning processes and thoughts that might be answered through this experience?; and
- Identify potential learning outcomes in a more specific way through the statement of objectives, concepts and skills learned. Include information from the learning cycle.

Projected Plans, Strategies, and Procedures:

- Selection and organization of materials, tools, and containers to be used by children;
- Organization and preparation of the environment (Consider time, flow of activity, organization of furniture arrangement of teacher and children in space, etc.);
- Preparation of children and/or parents (e.g., note sent home about upcoming study or a note to request that the child bring something or do something in preparation for the experience);
- Selection of children who will participate; How will the children participate Provide opportunities for cooperative problem solving.
- Questions, comments, or memories that you might share with children to help them reflect and reconnect with prior learning or experiences that are related to the experience at hand;
- Procedures.

Plans for Documentation and Assessment:

- What kinds of documentation will enable you to examine behavior and achievements related to the goals, hypotheses, questions, and/or intended learning objectives?; How will the children's progress be evaluated?;
- What methods of observation would be most useful and feasible (e.g., running records, time sampling, interviews, video recording, audio recording, or photographs)?;
- What tools/technology is needed? (e.g., video camera, tape recorder, paper and pencil, clip boards, still camera)?;
- Who will collect or record the observations?; and
- How will you coordinate your plans with other teachers?

Implications for Future Work with These Children and Future Teaching Situations:

- Discuss possible implications for future work with these children.
- Integration with other curriculum projects

3. Participation and Leadership in Facilitating Class Discussion on Reading Assignments.

Students will choose chapters from text and prepare to lead class discussion.

COURSE CALENDAR

6/7 Introduction to course, content, and expectations. Get acquainted and develop a profile of the class as individual and group learners (questions and concerns). Examine students' personal beliefs about the teaching and learning of math.
Discuss implications of early learning experiences with math and their influences on current classroom practices.
Discuss the historical, theoretical and social aspects of early childhood mathematics curriculum
- a perspective on arithmetic
- how children learn mathematics
- organizing the environment for problem solving

Assignment: Read Chapters 1-4.

6/14 Mathematics for the young child
Continue discussion of classroom design to support math learning
Discuss the importance of children's play
Developing math games, math centers, project work.
Discuss Chapters 1-4.
Assignment: Read Chapters 5, 10, 14, 16, 20 and 22.

6/21 Organizing an instructional program
Discuss Chapters 5, 10, 14, 16, 20 and 22.
Assignment: Read Chapters 6, 7, 8, 11 and 13.

6/28 Mathematical strands
- measurement
- probability and statistics
- geometry
- logical reasoning
- patterns, functions and algebra
- number

Discuss Chapters 6, 7, 8, 11 and 13.
Assignment: Read Chapters 9, 12, and 21.

7/5 Implications of mathematical programs
Assessment
Scope and sequence of various mathematics curricula
Students will bring in an example of a math program currently be used in schools
Discuss Chapters 9, 12 and 21.
Assignment: Read Chapters 15, 17, 18, and 19.

7/12 Examination of music, storytelling, drama, geometry, patterning, sorting and graphing, estimating, counting and comparing activities teachers can use to support children as they work together making responsible choices as the grow in math.
Discuss Chapters 15, 17, 18 and 19.
Assignment: Read Chapters 23, 24, 25 and 26

7/19 Further problem solving possibilities
Discuss Chapters 23, 24, 25 and 26
Bring final drafts of reflection papers for peer review.

7/26 Mathematics: Pre-kindergarten through primary perspectives
Students will share papers and activities with class.
Center reflection papers due.

RESOURCES

Copley, J.A. (ed.) (1999). Mathematics in the early years. Reston, VA. National Council of Teachers of Mathematics.

Additional readings will be distributed during class sessions. Video and slides will be used to illustrate and examine concepts and strategies presented in class.

EVALUATION:

Rubric for Reflection Paper

Superior A or A-	Meets Expectations B+, B or B-	Meets Minimal Expectations C+ or C	Unacceptable C- or D
• Takes initiative to exceed minimum requirements and uses multiple methods of assessment that capture critical moments in mathematical learning.	• Meets requirements of developmentally appropriate activities and implements basic assessment strategies to study and support the mathematical development of young children.	• Uses few appropriate connections made to assigned readings or class materials.	• Activities and assessment strategies lack detail, clarity and focus. Ideas not developed; lacks logic of support; confusing does not make sense.
• Engages in strong collaborative reflection and documentation of interpretation and analysis of mathematical materials and activities.	• Evidence of some collaborative engagement.	• Evidence of some attempts to collaborate but not well documented.	• Collaborative contribution not documented or fails to meet requirements.
• Explores principles, theory and relevant research addressed beyond the assigned readings and class materials.	• Explores principles, theories and relevant research addressed through assigned readings and class materials.	• Content supported by adequate theoretical argument and some details to support.	• Unclear thinking and/or unsubstantiated arguments Few appropriate connections to text or class handouts.

• Considers the complexities of family and community context when drawing conclusions and/or developing center activities and assessment strategies.	• Draws from observations and theoretical framework to inform center activities and assessment strategies.	• Adequate explanation of thinking. Logical and clear arrangement of basic ideas for center activities and assessment strategies.	• Center activities or assessment strategies are not supported by theory, research and observations.
• Clarity of writing, paragraphing, transitions and sentences make papers easy for the reader to follow. Attractive and appropriate APA manuscript format.	• Absence of usage and grammatical errors; accurate spelling; careful proofreading; follows APA manuscript format.	• Papers are readable but lack smooth flow of ideas. Required length of papers not met. Required number of references not met. Many errors in use of APA format.	• Spelling and grammatical errors are numerous enough to interfere with understanding. Does not follow APA format.

ATTENDANCE
Regular attendance will be taken and penalties imposed for excessive absences.

WRITTEN WORK
Assignments are due at class time on the date specified. Failure to turn in a paper on time can result in a penalty of one grade. Assignments are expected to be free of mechanical, typographical, grammatical, and spelling errors.

READING AND CLASS PARTICIPATION
Reading assignments will be given for each class. Chapters from texts should be read prior to class lecture and discussion on that topic. Students are responsible for all materials for all materials as assigned, including text and any supplemental readings. Class participation is strongly encouraged as we all have experiences from which others can learn. We need to build and construct our knowledge as we proceed through this course.

COURSE EVALUATION

Assessments	Links to Course Outcomes	Percentage of Grade
Mathematics Learning Center	1, 2, 3, 4, 5, 6, 7	30%
Small and Large Group Reflection and Analysis of Activities for Math Center. Pre-Primary or Primary	1, 2, 3, 4, 5, 6, 7	10%
Chapter Discussion	2, 3, 5	10%
Evidence of Behavior Supporting Dispositions and Responsibilities of Adult Learners.	2, 3, 5	10%
Reflection Paper	1, 2, 3, 4, 5, 6, 7	40%

Note: ALL PAPERS/PROJECTS MAY BE RETURNED VIA A SELF-ADDRESSED, STAMPED ENVELOPE OR PICKED UP FROM INSTRUCTOR AFTER GRADES ARE POSTED. PAPERS ARE NOT AVAILABLE FOR PICK-UP IN THE SOE OFFICE.

ACADEMIC HONESTY POLICY:
Students at Webster University are expected to practice academic honesty.
Avoiding Plagiarism
Plagiarism is intentionally claiming that another person's work is his/her own or implying that another person's work is his/her own (through inadequate or inaccurate citations of reference material.)

Students:

- Should not copy whole portions of text from another source as a major component of papers or projects.
- Should identify the title, author, page number/webpage address, and publication date of works when directly quoting small portions of texts, articles, interviews, or websites.
- Should appropriately identify the source of information when paraphrasing (restating) ideas from texts, interviews, articles, or websites.
- Should follow the guidelines of the American Psychological Association Style Guide when referencing all research sources.

For further information about the consequences of academic dishonesty please consult the Webster University Student Handbook.

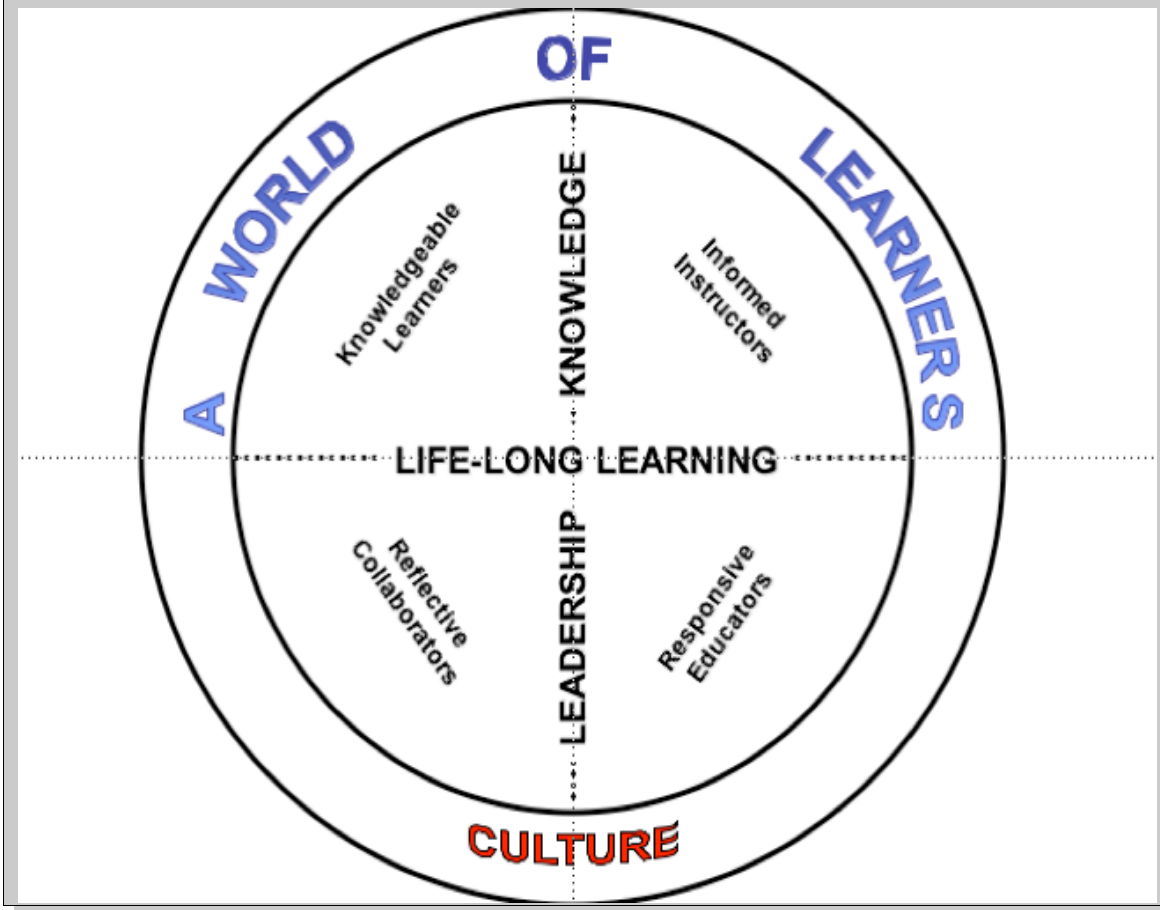
ACCESSIBILITY/ACCOMODATIONS POLICY:
If you have a disability that may have some impact on your work in this class and for which you may require accommodations contact the Director of the Academic Resource Center, Dr. Pat McLeese, at (314) 968-7495.

WEBSTER UNIVERSITY
SCHOOL OF EDUCATION

Vision: " . . . We all must work to make this world worthy of its children." (Casals, 1970)

Mission: The School of Education at Webster University provides its students with the knowledge, experiences, and practical tools that help them guide both themselves and others toward lifelong learning. The School of Education is a community of educator-scholars who apply critical reflections and creative energies to enhance learning in schools and other educational settings. The faculty strives to support this community by modeling effective teaching practices based on sound theory and research. Personalized approaches create a challenging, yet supportive environment that permits the risk-taking necessary for learning and growth. The School of Education encourages its faculty and students to work actively toward this end, keeping in mind that action must be rooted in visionary, yet realistic, thinking. This thought and action process underscores the development of an inner-directed self-understanding, an outer-directed global perspective, and an appreciation of human diversity that arises from both.

Theme: Developing a world of learners through knowledge, leadership, and life-long learning.



The universal mandala (a circle with intersecting vertical and horizontal lines) graphically represents the conceptual framework of the School of Education. The outer circle provides the framework for a "world of learners" in cultural settings. The two axes represent the theme components of knowledge, leadership, and life-long learning. These lines are broken to emphasize the fluid relationship of the goals and integrated concepts. Each quadrant represents one of the school's four goals for its candidates: to develop knowledgeable learners, informed instructors, reflective collaborators, and responsive educators.

Goals

1. Education candidates will demonstrate knowledge of the subject matter, knowledge of the learner, and knowledge of pedagogy based on inquiry and scholarship.

   The knowledgeable learner:
   1.1 knows content that supports conceptual understanding;
   1.2 applies tools of inquiry to construct meaningful learning experiences;
   1.3 identifies developmental factors in student learning; and
   1.4 understands theoretical principles of effective instruction to plan learning experiences.

2. Education candidates will incorporate multiple assessment and instructional strategies to support effective educational practices based on research and theory.

   The informed instructor:
   2.1 designs curriculum based on students' prior knowledge, learning styles, strengths, and needs;
   2.2 understands and uses a range of instructional strategies;
   2.3 uses a variety of communication modes, media, and technology to support student learning; and
   2.4 employs a variety of formal and informal assessments to monitor learning and modify instruction.

3. Education candidates will reflect on the roles educators take as leaders of change through collaboration with colleagues, students, and families in schools and communities.

   The reflective collaborator:
   3.1 values and integrates reflection to grow as a professional;
   3.2 promotes communication and collaboration with colleagues, families, and community leaders;
   3.3 seeks relationships with families and students to support student learning; and
   3.4 initiates change that benefits students and their families.

4. Education candidates will demonstrate respect for diversity through responsive teaching and learning that values individual differences.

   The responsive educator:
   4.1 understands and responds appropriately to issues of diversity
   4.2 acknowledges social and cultural contexts to create effective teaching and learning environments;
   4.3 adapts instruction to the learner's knowledge, ability, and background experience; and
   4.4 identifies resources for specialized services when needed.

Dispositions:

NCATE defines dispositions as "the values, commitments and professional ethics that influence behaviors toward students, families, colleagues, and communities and affect student learning, motivation, and development as well as the educator's own professional growth. " (Professional Standards, p. 53) There is significant value in focusing attention on qualities that make an effective teacher.

1. Understands and Respects Self
   - 1.1 Understands and respects that s (he) may be different from others
   - 1.2 Embraces an openness to change (adaptability, flexibility)
   - 1.3 Exhibits curiosity
   - 1.4 Engages in reflection

2. Understands and Respects Others
   - 2.1 Understands, respects, and responds appropriately to diversity in a variety of settings
   - 2.2 Exhibits empathy
   - 2.3 Commits to fairness and honesty
   - 2.4 Listens respectfully to other points of view

3. Understands and Respects Professional Communities
   - 3.1 Commits to professional behavior in university and school cultures
   - 3.2 Practices informed decision-making in university and school cultures
   - 3.3 Communicates and collaborates in university and school cultures
   - 3.4 Accepts academic rigor (willingness to work/ high expectations)
   - 3.5 Affects change with courage and confidence

.