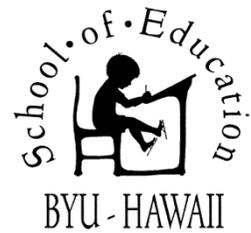




ELED 360:
Science Methods for the Elementary Teacher
(3 credits)
Summer A 2014

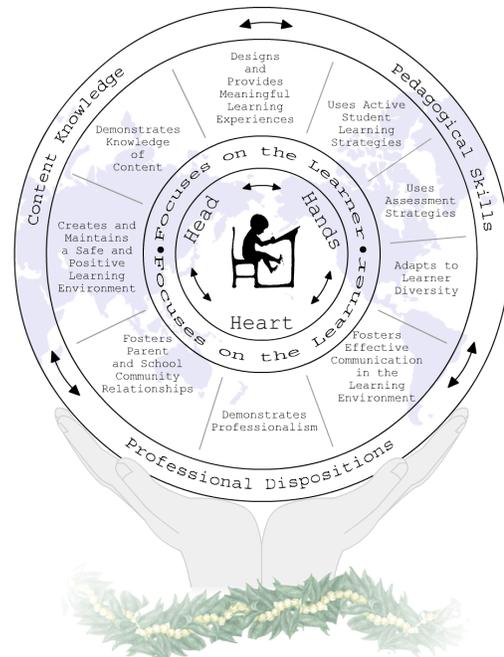


Instructor	Ammon Wilcken	Prerequisites	Admission to the School of Education
Office /Hours	Open Door Policy EB 122	Class Days	Monday, Wednesday, Friday
Phone	Office: 808-675-3685 Cell: 808-499-5412	Class Hours	12:10-2:20 PM
E-mail:	ammon.wilcken@byuh.edu	Meeting Room	SEB 107

Mission Statement: Recognizing the unique mission of Brigham Young University Hawaii, the School of Education prepares quality teachers with the content knowledge, pedagogical skills, and professional dispositions required to meet the needs of students in today's diverse and changing society by teaching and modeling (a) life-long learning and problem-solving abilities; (b) best current educational practices, balanced with gospel principles and (c) caring, compassionate, and collaborative service in the home, school, church and community, both locally and internationally.

Conceptual Framework: To assist the School of Education in meeting its Mission Statement, the Conceptual Framework provides a more defined, focused target around which the teacher education programs are designed. The visual shown below is a representation of this conceptual framework, which is also referred to as "The Learner is at the Center of Our Stewardship."

With the child, or learner, at the center of our stewardship, the three areas of stewardship are head, hands and heart, also referred to as content knowledge, pedagogical skills and professional dispositions, respectively.



Course Goals

1. This course will familiarize students with the methods used to plan, prepare, and present inquiry based science curricula in k-6 classrooms.
2. This course will provide students with an overview of the science content most commonly taught in k-6 classrooms.
3. This course will emphasize the professional dispositions required of an effective teacher.

Textbook

In place of a textbook, students will join the [National Science Teacher Association \(NSTA\)](#). A student membership costs \$35 and includes a journal subscription as well as online access to the NSTA archives. Most class readings will be assigned from these archives.

Other readings will be assigned during throughout the course. These additional readings will be available through the library, through links on Canvas, or as handouts during class.

Assignments and Grading

Assignment	Point Value
Preparation Activities	100
Application Activities	100
Mini Lessons	90
Reflection Pieces	200
Lesson Plan	100
Final Exam	100
Completion of Course Evaluation	10
Total	700

Assignment Descriptions

The following are brief descriptions of the assignments. You will receive more complete directions for each item when it is assigned.

Preparation Activities

Preparation activities will be related to assigned readings or viewings. These activities will be directly related to in-class, small-group activities. Each group member will submit an individual report on the groups' preparation for the activities. The instructor will require evidence of preparation, which will be described with each assignment. Possible grades: Prepared (10 points), Minimally Prepared (6 points), Unprepared/Absent (0 points). The two lowest scores will be dropped.

Application Activities

Application activities require students to practice the concepts learned in class and will vary depending on the content being covered. Possible grades: Mastery (10 points), Progress (8 points), Emerging Progress (6 Points), Incomplete (0 points). The lowest score will be dropped.

Mini Lessons

Three times during the semester, students will prepare and present 8-minute science lessons. Each mini-lesson will provide an opportunity to practice specific methods for teaching science and receive feedback. Possible grades: Well Prepared (30 points), Progressing (24 points) Minimally Prepared (18 points), Unprepared/Absent (0 points).

Reflection Pieces

Reflection pieces require students to synthesize their learning and show evidence that they are connecting the concepts covered in class to the contexts where they expect to teach. A thorough reflection will require at 1-2 pages of thoughtfully written prose and will respond to all of the questions listed in the assignment sheet. Possible grades: Thorough (40 points), Satisfactory (32 points), Emerging (24 points), and Incomplete (0 points). The lowest score will be dropped.

Lesson Plan

Students will demonstrate their understanding of the 5E Inquiry Cycle by creating a detailed lesson plan using this format, which is commonly used in science teaching. Prior to the creating the lesson, students will examine several models. The lesson plan will be graded using a scoring guide, and be worth up to 100 points.

Final Exam

The final exam will be a comprehensive test of your learning throughout the course.

Grades will be earned according to the following scale:

100-93	92-90	89-87	86-83	82-80	79-77	76-73	72-70	69-67	66-63	62-60	59-0
A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F

Calendar

This is a tentative schedule and is subject to change.

Date	Topics	Readings/Viewings /Assignments
4/21/2014	Course Overview/What is Science?	Preparation Activity #1: Myths of Science
	Application Activity #1: Science Background What is Science?, Part II	Preparation Activity #2: Science Process Skills
4/23/2014	Scientific Modeling	Reflection Piece #1: What is science?
	The Sense of Wonder and Scientific Exploration	Application Activity #2: Scientific Modeling
4/25/2014	Experimental Design	Complete Application Activity #2
	Application Activity #3: EDD Practice Scenarios Science Standards & Standardized Assessments	Preparation Activity #3
4/28/2014	Naïve Conceptions	Application Activity #4 Naïve Conception Interviews
	Conceptual Change Model	Reflection Piece #2: Naïve Conceptions
4/30/2014	5 E Inquiry Cycle: Demonstration	Preparation Activity #4: The Inquiry Cycle
	5 E Inquiry Cycle: Discussion of the Inquiry Cycle	Preparation Activity #5: Inquiry Issues
5/2/2014	5 E Inquiry Cycle: Analysis of Science Lesson Plans	Reflection Piece #3: Inquiry
	Picture Perfect Science: Science Through Children's Literature	Preparation Activity #6: Picture Perfect Science
5/5/2014	More Picture Perfect Science	Mini-lesson # 1
	Mini-lessons: Science through Children's Literature	Reflection Piece #4: Interdisciplinary Inquiry
5/7/2014	Science Support Strategies: Vocabulary	Preparation Activity #7: Science Notebooks
	Science Support Strategies: Science Notebooks	Preparation Activity #8: Graphic Organizers
5/9/2014	Science Support Strategies: Graphic Organizers Application Activity #5 [in class]	Preparation Activity #9: Classroom Organization
5/12/2014	Science Exploration and Classroom Organization Science Circus #1 Application Activity #7 [in class]	Application Activity #6: Graphic Organizers Reflection Piece #5: Science Strategies
5/14/14	Using Questions to Guide Exploration Questions, anyone?	Preparation Activity #10: Questioning Strategies Application Activity #8: Question Writing

5/16/14	Science Circus Planning Session Science Circus #2 (Student Planned)	Reflection Piece #6: Additional Science Strategies Preparation Activity #11: Data Collection & Analysis
5/19/14	Data Analysis: Descriptive Data Analysis: Explanatory	Application Activity #9: Data Collection & Analysis Preparation Activity #12: Lab Instructions
5/21/14	Science Simulations Science with Simple Stuff	Prepare Mini-Lesson #2 Reflection Piece #7: Inquiry & Exploration
5/23/14	Mini-Lessons Effective Explanations using Media	Preparation Activity #13: Presentations and Film Prepare Mini-Lesson #3
5/26/14	Experiencing Film in Science Lessons Mini-Lessons	Reflection Piece #8: Media in Science Lessons Lesson Plan Draft 1
5/28/14	Assessing Science Learning Technology-assisted Data Collection and Analysis	Application Activity #10: Lesson Plan Peer Review [online]Lesson Plan Draft 2
5/30/14	Technology-assisted Data Collection and Analysis STEM in Elementary Schools	Preparation Activity #14: PBL Application Activity #11: Engineering Challenge
6/2/14	Project/Problem Based Learning Engineering Challenge	Lesson Plan Final Copy
6/4/14	Science Fair Success	Reflection Piece #9: Summary of Course Learning
6/6/14	Final Exam	

University, College, and Department Policy Statement(s) and Disclosure(s)

Academic Honesty

Cheating is a form of dishonesty where a student attempts to give the appearance of a level of knowledge or skill that the student has not obtained. Examples include: (a) copying from another person's work during an examination or while completing an assignment, (b) allowing someone to copy from you during an examination or while completing an assignment, (c) using unauthorized materials during an examination or while completing an assignment, (d) collaborating on an examination or assignment without authorization, and (e) taking an examination or completing an assignment for another, or permitting another to take an examination or to complete an assignment for you. [Statement cited from the BYU Provo Honor Code]

Plagiarism is a form of intellectual theft that violates widely recognized principles of academic integrity as well as the Honor Code. Such plagiarism may subject the student to appropriate disciplinary action administered through the university Honor Code Office, in addition to academic sanctions that may be applied by an instructor. Inadvertent plagiarism, whereas not in violation of the Honor Code, is nevertheless a form of intellectual carelessness that is unacceptable in the academic community. Plagiarism of any kind is completely contrary to the established practices of higher education, where all members of the university are expected to acknowledge the original intellectual work of others that is included in one's own work. In some cases, plagiarism may also involve violations of copyright law.

Per BYUH policy statement, instructors should take actions that are fair and equitable under the circumstances and should attempt to reach an understanding with the affected student on the imposition of an appropriate action. In some cases, the department, the college, or the university may also take actions independent of the instructor. Examples of possible actions include, but are not limited to the following: reprimanding the student orally or in writing; requiring work affected by the academic dishonesty to be redone; administering a lower or failing grade on the affected assignment, test, or course; removing the student from the course; and/or recommending probation, suspension, or dismissal.

Children in Class

While we appreciate the challenges faced in babysitting when both parents are students, this situation has posed challenges for instructors and other students in classes. In the case of emergencies, please consult your instructor if there is a need to make an exception to this policy on basically a one-time only basis. This one-time exception should not be cause for any disruption to the regular conduct/teaching of the class.

Dress Code

As you are in a professional program, faculty and staff in the School of Education expect that you will not embarrass them by being out of the clearly stated BYUH dress standards. Dealing with these issues is uncomfortable, at best, for all parties involved. The current dress code has been clearly interpreted in an address to the women on campus by Sister Wheelwright, wife to the President of BYUH. Clothing should be loose fitting as opposed to form fitting; not display inappropriate parts of the body when attending classes or conducting activities in class or in the public school classrooms, including bending over to help students, reaching upwards to write on a board, etc. Honoring the dress code also includes raising the quality of the clothing worn to a standard that is reflective of a professional, e.g., no jeans, cut-offs, PE clothing, faded/tattered look. Men are expected to follow the published standards for grooming, e.g., hair style/length, facial hair, general grooming appearance.

Final Examination Policy

Brigham Young University Hawaii policy is that final exams are offered on the specific day and time as determined by the official university final exam schedule. Students must plan travel, family visits, etc., in a way that will not interfere with their final exams. Less expensive air fares, more convenient travel arrangements, family events or activities, and any other non-emergency reasons are not considered justification for early or late final exams. Exceptions to this policy would include (a) university-sponsored activities which take the student away from the campus at the time of the final exam, (b) emergency situations which are clearly beyond the control of the student or (c) some other extenuating circumstance clearly beyond the scope of the student's control that would merit a deviation from the spirit and letter of the policy statement. In such cases, the student must submit a written letter outlining the reason(s) for an exception to the university policy to the Dean of the School of Education as soon as the situation arises.

Grades and Grading

The School of Education operates on a standards-based paradigm. It is imperative students understand that a standards-based program means that all assignments in a course must be completed at or above the competency level. You, therefore, need to demonstrate at least minimum competency in every graded assignment. If you do not demonstrate competency on all graded assignments, including exams, within the semester/term, you will be need to either repeat the entire course or components of the course.

In addition, out of fairness to students who complete assignments well on the first attempt, any assignment that must be re-submitted to meet the standard will not receive a grade higher than a competency level rating. In a standards-based program, grading is not determined by merely averaging grades. In other words, you cannot take an "F" on one assignment and an "A" on another and conclude that you have "met" the course requirements because your "average" is a "C." Again, in a true standards-based program, averaging does not exist.

The following interpretation of grades applies in our standards-based program:

A represents achievement well above the standard; marked by superior performance, distinction, and excellence in originality, creativity, depth of analysis, seeing beyond the obvious, making connections and relationships. While this level of achievement is difficult to come by, all members of the class could earn this grade.

B represents achievement above the standard, marked by solid accomplishment and goodness, with room for improvement to reach the highest level of competency.

C represents achievement at an acceptable level of the standard, marked by an acceptable level of knowledge and skills relevant to the desired course outcomes.

D represents achievement at a level of performance below the acceptable competency.

F represents a level of competency that is clearly failing, marked by lack of understanding and/or poor work habits and/or failure to submit anything for the assignment.

Pagers and Cell Phones

Simply stated, pagers or cell phones are not to be used in the classroom. This includes taking incoming calls, placing calls, sending text messages, checking pager messages, etc. If there is an emergency that requires you to have your pager or cell phone on during the time of class, please notify your instructor ahead of time of the nature of the emergency. Also, set your pager or cell phone to the vibrate setting as opposed to the ring setting. Again, this exception is only for absolute emergencies. Otherwise, if class is interrupted with a pager or cell phone, the owner of that device will provide the class with cookies and drinks at the next class meeting.

Personal Computers in Class

While we encourage the use of computers in the classroom, such use is intended to complement, not detract from, class content. It should go without saying that any use of computers during class time that is not related to the class is not appropriate. This would include, but is not limited to, checking email, sending email, doing homework for another class, etc.

Professional Dispositions

Evidence of the development of students' professional dispositions is a required accreditation assessment for the School of Education. We gather this evidence through the use of the School of Education Professional Dispositions sheet (blue). Any concern regarding disposition standards will be addressed on an individual basis with the professor, program chair and dean. No student can complete the teacher education program who does not meet each and every professional disposition consistently.

Students will complete a self-assessment at the beginning and the end of each course throughout the teacher education program. The professor will countersign each self-assessment at the end of each course. This countersignature will constitute agreement with the student's self-assessment and indicate having met the requirement for these standards. Any concern regarding disposition standards will be addressed on an individual basis with the professor, program chair and dean. No student can complete the teacher education program who does not meet each and every professional disposition consistently.

Sexual Harassment

Title IX of the U. S. education amendments of 1972 prohibits sex discrimination against any participant in an educational program or activity that receives federal funds, including Federal loans and grants. Title IX also covers student-to-student sexual harassment. If you encounter unlawful sexual harassment or gender-based discrimination, please contact the Human Resource Service at [780-8875](tel:780-8875) (24 hours).

Student(s) With Disabilities

Brigham Young University Hawai'i is committed to providing a working and learning atmosphere, which reasonably accommodates qualified person with disabilities. If you have any disability that may impair your ability to complete this course successfully, please contact the Students with Special Needs Counselor, Leilani Auna, at [293-3999](tel:293-3999) or [293-3518](tel:293-3518). Reasonable academic accommodations are reviewed for all students who have qualified documented disabilities. If you need assistance or if you feel you have been unlawfully discriminated against on the basis of disability, you may seek resolution through established grievance policy and procedures. You should contact the Human Resource Services at [780-8875](tel:780-8875) (24 hours).

Syllabus

The syllabus represents the professor's best efforts to provide a map for the course. It, however, is not to be construed as an iron-clad contract between professor and students. The professor retains the right to adjust the course syllabus based on reasonable professional concerns. Any adjustments by the professor will be fully disclosed and discussed with the class.

Tardies, Absences, Late Assignments:

Tardies: Tardy to class is defined as arriving anytime after the scheduled start of class, but not more than fifteen minutes after the start of the class. A student tardy more than **twice** will have their final course grade reduced by three (3) percentage points or one-third letter grade (A to A-, A- to B+, B+ to B, etc.). Note that leaving classes earlier than officially dismissed by the faculty member will be treated as a tardy for purposes of attendance. The same principle will apply if a student leaves during the class and then returns within the fifteen (15) minutes designated.

Absences: Unexcused absence from class is defined as failing to arrive within the initial fifteen (15) minutes of the class hour. A student who is absent will have their final course grade reduced by **one third** of a letter grade for each class hour they are absent. Note the critical nature of this policy as it applies to blocked classes. For example, if a student is absent on one day of a three-hour blocked class, (s)he has been absent the equivalent of one week of regular class time and will have their grade reduced by 1 full letter grades.

Late Assignments: Because all assignments given in the School of Education courses are important, all assignments must be completed in order to receive credit for the course. Late assignments received by the faculty

within twenty-four (24) hours of the end of the class in which they were due will be accepted and graded; however, the maximum earned mark for a late assignment will be a C-. Assignments turned in later than twenty-four (24) hours must still be turned in but may not receive any credit.

Exceptions: University approved activities that prevent a student from attending class are exceptions to this policy, provided the student has obtained the appropriate approvals as outlined in university policy and notified the School of Education faculty member **in advance of the absence**. Other exceptions to this policy include situations beyond the control of the student. This would include, but not be necessarily limited to hospitalization, doctor ordered confinement, maternity, accidents, etc. **In every case, the acceptable procedure to follow includes notifying the instructor as soon as possible, preferably in advance.** Please note that all faculty members have multiple ways to be notified: telephone voice mail, computer email, message boards by office doors, secretarial contact, etc.

Standards Related to This Course

BYU Education Department Outcomes

Outcome 1: Demonstrate literacy in basic principles and knowledge of content in the specialty area.

Outcome 2: Understand and apply basic learning theories and models in the classroom.

Outcome 3: Use student input and information from diagnosis of student learning needs to develop learning outcomes.

Outcome 4: Evaluate teaching and curriculum resources for effective use in the instructional process.

Outcome 5: Plan lessons which use authentic situations, previous learning and integration across subjects.

Outcome 6: Provide learning experiences which actively engage students as individuals and as members of collaborative groups.

Outcome 7: Create a communication-rich environment that supports and encourages language development and use.

Outcome 8: Use a variety of instructional strategies to meet the needs of diverse learners, including students of diverse cultural backgrounds.

Outcome 9: Use content curriculum standards to construct assessments, identify performance indicators, and create lessons needed to prepare for the assessments.

Outcome 10: Use effective classroom management techniques that foster positive interpersonal relationships, self-control, self-discipline, and responsibility.

Outcome 11: Use community and parent resources as an integral part of the teaching process to promote student learning.

Outcome 12: Demonstrate competency in the use of technologies available in the school setting.

Outcome 13: Work collaboratively with other professionals.

Outcome 14: Demonstrate positive dispositions (attitudes, actions, ethics, and good work habits) in line with those required for the profession.

Hawaii Teacher Performance Standards

Standard 1: Focuses on the Learner. The effective teacher consistently engages students in appropriate experiences that support their development as independent learners. Evidences include the extent to which the teacher: Provides opportunities for students to assume responsibility for their own learning, shaping tasks and pursuing their own goals and aspirations; Nurtures students' desire to learn and achieve; Demonstrates concern and interest by taking time to listen and respond to students; Uses student experiences, interests and real-life situations in instruction; Uses developmentally appropriate activities to promote student success; Makes instructional decisions which consider students' physical, social, emotional and cognitive development.

Standard 2: Creates and maintains a safe and positive learning environment. The effective teacher consistently creates a safe and positive learning environment that encourages social interaction, civic responsibility, active engagement in learning and self-motivation. Evidences include the extent to which the teacher: Promotes empathy, compassion, and mutual respect among students; Uses effective classroom management techniques that foster self-control, self-discipline and responsibility to others; Models a caring attitude and promotes positive interpersonal relationships; Promotes students' intrinsic motivation by providing meaningful and progressively challenging developmentally appropriate learning experiences that enable student success; Provides learning experiences which actively engage students as individuals and as member of collaborative groups; Manages a classroom where students are encouraged to reflect, express interests, make choices, set goals, plan and organize, self-evaluate and produce quality work.

Standard 3: Adapts to learner diversity. The effective teacher consistently provides opportunities that are inclusive and adapted to diverse learners. Evidences include the extent to which the teacher: Develops rapport with all students; Fosters an appreciation of human and cultural differences; Helps every student achieve success; Adapts instruction to students' differences in development, learning styles, strengths and needs; Seeks additional resources to support student achievement; Fosters trust, respect and empathy among diverse learners.

Standard 4: Fosters effective communication in the learning environment. The effective teacher consistently enriches communication in the learning environment. Evidences include the extent to which the teacher: Communicates openly with all students and others working in the learning

environment; Develops communication skills for active inquiry, collaboration and supportive interaction; Encourages self-expression, reflection and evaluation; Models and promotes clear and logical oral and written expression, using Standard English or a target language as appropriate; Applies principles of language acquisition and development to the teaching of communication skills; Fosters sensitivity to variations in meaning in verbal and non-verbal communication; Engages students in different modes of communication; Uses the school's current technologies to enrich student literacy.

Standard 5: Demonstrates knowledge of content. The effective teacher consistently demonstrates competency in content area(s) to develop student knowledge and performance. Evidences include the extent to which the teacher: Keeps abreast of current developments in content area(s); Teaches mastery of language, complex processes, concepts and principles unique to content area(s); Utilizes the school's current technologies to facilitate learning in the content area(s); Connects knowledge of content area(s) to students' prior experiences, personal interests and real-life situations; Possesses an understanding of technology appropriate to the content area, e.g. computer-assisted instruction.

Standard 6: Designs and provides meaningful learning experiences. The effective teacher consistently plans and implements, meaningful learning experiences for students. Evidences include the extent to which the teacher: Plans and implements logical, sequenced instruction and continually adjusts plans based on learner needs; Provides learning experiences and instructional materials that are developmentally appropriate and based on desired outcomes, principles of effective instruction and curricular goals; Incorporates a variety of appropriate assessment strategies as an integral part of instructional planning; Links concepts and key ideas to students' prior experiences and understandings, using multiple representations, examples and explanations; Applies concepts that help students relate learning to everyday life; Provides integrated or interdisciplinary learning experiences that engage students in generating knowledge, using varied methods of inquiry, discussing diverse issues, dealing with ambiguity and incorporating differing viewpoints; Teaches for mastery of complex processes, concepts and principles contained in the Hawaii Content and Performance Standards; Provides knowledge and experiences that help students make life and career decisions; Organizes material and equipment to create a media-rich environment.

Standard 7: Uses active student learning strategies. The effective teacher consistently uses a variety of active learning strategies to develop students' thinking, problem-solving and learning skills. Evidences include the extent to which the teacher: Involves students in setting goals and standards, selecting tasks, planning, implementing and evaluating to produce quality performance and quality products; Helps students to question, problem-solve, access resources, use information to reach meaningful conclusions and develop responsibility for their own learning; Provides challenging learning experiences which develop higher order thinking skills; Varies instructional roles (e.g., instructor, facilitator, coach, co-learner, audience) in relation to the content and purpose of instruction and students' needs; Engages students in active, hands-on, creative, open-ended, problem-based learning experiences; Provides opportunities for students to apply and practice what is learned; Uses the school's current technologies as tools for teaching and learning.

Standard 8: Uses assessment strategies. The effective teacher consistently applies appropriate assessment strategies to evaluate and ensure the continuous intellectual, social, physical and emotional development of the learner. Evidences include the extent to which the teacher: Evaluates students' performances and products objectively and fairly; Uses a variety of appropriate assessment strategies to enhance knowledge of learners and appropriately modifies teaching and learning strategies; Involves students in developing assessment standards and criteria; Engages students in self-assessment activities and encourages them to set personal achievement goals; Obtains and uses information about students' experiences, strengths, needs and progress from parents, colleagues and students themselves; Uses assessment data to monitor and evaluate students' progress toward achieving the Hawaii Content and Performance Standards; Maintains appropriate and accurate records of student achievement and communicates students' progress to students, parents and colleagues as needed.

Standard 9: Demonstrates professionalism. The effective teacher continually evaluates the effects of his or her choices and actions and actively seeks opportunities to grow professionally. Evidences include the extent to which the teacher: Engages in relevant opportunities to grow professionally, e.g., taking university/college or in-service coursework, actively participating in a professional organization, serving on a cadre, council, or committee or serving as a cooperating teacher, mentor or advisor; Reflects on practices and monitors own teaching activities and strategies, making adjustments to meet learner needs; Provides and accepts evaluative feedback in a professional manner; Conducts self ethically in professional matters; Models honesty, fairness and respect for individuals and for the laws of society; Demonstrates good work habits including reliability, punctuality, and follow-through on commitments; Maintains current knowledge in issues and trends in education; Practices effective listening, conflict resolution and group-facilitation skills as a team member; Works collaboratively with other professionals; Participates actively and responsibly in school activities.

Standard 10: Fosters parent and school community relationships. The effective teacher establishes and maintains strong working relationships with parents and members of the school community to support student learning. Evidences include the extent to which the teacher: Collaborates with parents and school community members to support student learning; Consistently seeks opportunities to build strong partnerships with parents and community members; Supports activities and programs which encourage parents to participate actively in school-related organizations and activities; Establishes open and active lines of communication with parents; Utilizes community resources to enhance student learning.

NCATE SPA Standards (ACEI)

1.0 Development, Learning, and Motivation--Candidates know, understand, and use the major concepts, principles, theories, and research related to development of children and young adolescents to construct learning opportunities that support individual students' development, acquisition of knowledge, and motivation.

2.2 Science—Candidates know, understand, and use fundamental concepts of physical, life, and earth/space sciences. Candidates can design and implement age-appropriate inquiry lessons to teach science, to build student understanding for personal and social applications, and to convey the nature of science;

3.1 Integrating and applying knowledge for instruction—Candidates plan and implement instruction based on knowledge of students, learning theory, connections across the curriculum, curricular goals, and community;

3.2 Adaptation to diverse students—Candidates understand how elementary students differ in their development and approaches to learning, and create instructional opportunities that are adapted to diverse students;

3.3 Development of critical thinking and problem solving—Candidates understand and use a variety of teaching strategies that encourage elementary students' development of critical thinking and problem solving;

3.4 Active engagement in learning—Candidates use their knowledge and understanding of individual and group motivation and behavior among students at the K-6 level to foster active engagement in learning, self motivation, and positive social interaction and to create supportive learning environments;

3.5 Communication to foster collaboration—Candidates use their knowledge and understanding of effective verbal, nonverbal, and media communication techniques to foster active inquiry, collaboration, and supportive interaction in the elementary classroom.

4.0 Assessment for instruction—Candidates know, understand, and use formal and informal assessment strategies to plan, evaluate and strengthen instruction that will promote continuous intellectual, social, emotional, and physical development of each elementary student.

5.1 Professional growth, reflection, and evaluation—Candidates are aware of and reflect on their practice in light of research on teaching, professional ethics, and resources available for professional learning; they continually evaluate the effects of their professional decisions and actions on students, families and other professionals in the learning community and actively seek out opportunities to grow professionally.

5.2 Collaboration with families, colleagues, and community agencies—Candidates know the importance of establishing and maintaining a positive collaborative relationship with families, school colleagues, and agencies in the larger community to promote the intellectual, social, emotional, physical growth and well-being of children.