



Southern Wesleyan University

School of Education

***“Educators who demonstrate scholarship within a Christian ethic of care”***

**Course Number and Title:** EDUC 3763 Teaching Science in the Elementary School

**Number of Credit Hours:** 3

**Instructor and Title:** Dr. Lavinia B. Anderson/ Assistant Professor

**Class Day and Time:** Monday/Wednesday/Friday 8:00-8:50

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**Semester, Year:** Fall 2013

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### **Course Description**

#### **EDUC 3763 Teaching Science in the Elementary School/Field Experience**

This course is designed to provide an overview of methods, materials, and current research relating to the teaching of science in the elementary school classroom rather than teaching the skills and knowledge bases for science. The purpose is to enable the teacher candidate to effectively teach science concepts in the elementary school. Emphasis will be placed on student-centered approaches to science including discovery, inquiry, and experimentation. Current theories and standards for using science process skills and various technologies in the elementary classroom are explored. Required of all elementary education teacher candidates. **Included in this course will be 36 hours of field placement experience. The field placement will count for 25% of the final grade in the course.**

### **Prerequisites**

Admission to the teacher education program, which includes Lock 1 admission, junior year status, and Praxis 1 scores on file is required. *Course prerequisites: BIOL 1103, PHSC 1503, PHSC 1513.*

### **Relationship to Conceptual Framework:**

The theme of the unit is integrated with this course by acquainting future professional educators that teaching requires a passion for learning, compassionate and respectful interactions with learners and colleagues, and recognition that the community and its pluralist nature is an integral part of the learning process, in order to successfully prepare elementary pupils for lives of social, intellectual, and personal development. All of this is to be accomplished through a Christian ethic of care.

### **Required Textbooks and Materials:**

- **Elementary Science Methods: A Constructivist Approach.** David Jerner Martin. Wadsworth Cengage Learning. 2009. ISBN: ISBN 13:978-0-495-50677-5

## **Science Standards**

<http://ed.sc.gov/agency/offices/cso/standards/>

### **Additional Materials**

1. Chalk & Wire and a personal thumb drive are required. E-folios will be used to store information and artifacts completed in this course.
2. Students will use computers, and word processing, to meet the technology requirements.
3. A notebook is required to house information accumulated and reflections written from the field experience will be submitted at the end of the course as part of the final grade.

### **Other Science Resources**

4. Howe, Ann C. and Sharon E. Nichols. (2001). *Case Studies in Elementary Science*. NJ: Prentice-Hall, Inc. ISBN 0-13-082467-4
5. Dobey, Daniel and Robert Beichner. (2004). *Essentials of Elementary Science*. Boston: Pearson Education, Inc. ISBN 0-205-40265-8
6. Lorbeer, George C. and Leslie W. Nelson. (1996). *Science Activities for Children, Volume 1*. Brown and Benchmark. ISBN 0-697-24150-5
7. Eichinger, John. (2001). *40 Strategies for Integrating Science and Mathematics Instruction, K-8*. NJ: Prentice-Hall, Inc. ISBN 0-13-122516-9
8. South Carolina Curriculum Standards: Science  
*National Science Education Standards (1996)*
9. AOP Hub kits
10. *Project Wild*, provided by Department of Natural Resources guest speaker
11. Ranger Rick magazine

### **Accommodations Statement**

If you have a disability that interferes with your learning, test-taking, or completing assignments outlined in the syllabus, please contact Mrs. Carol Sinnamon, Director of Counseling and Health Services. She will help secure the right documentation, know what accommodations are appropriate, and authorize your teachers to accommodate your disability. She will disclose the information you request only to those whom you identify. Neither she nor your teachers can provide accommodations unless you specifically request these each semester. Documentation must meet the guidelines of the Americans with Disabilities Act (ADA). We want you to have equal opportunity to learn and have fair assessment of that learning. Your abilities, skills, and efforts should determine your success or failure, not your disability.

### **Counseling Services**

Free services are available in the counseling center for help related to any issues or problems you experience this semester. Contact the secretary, Renee Sims at 5131 or 5130, or by e-mail [rsims@swu.edu](mailto:rsims@swu.edu) to schedule an appointment with either Carol Sinnamon, counselor and director, or Emily Germain, masters counselor intern. The counseling center

is on 3rd floor of the Campus Life Center near the elevator. Your contact with a counselor is confidential.

### **Technology Integration**

Teacher candidates will be required to use word processors for all assignments. They will access information from the Internet. Students will use PowerPoint presentations or Promethean Board and they will use presentation software for their model lessons.

### **Culturally Responsive Teaching**

Students will learn how to address issues related to different learning styles, varying abilities, and cultural backgrounds in their own classrooms by developing activities and materials relating to the use of music, art, and drama that will be incorporated into lessons designed for the content areas of early childhood and elementary school program.

### **Instructional Methods**

Instructional methods include modeling effective teaching methods by the instructor, class discussion, research, use of technology, and development of units and lesson materials appropriate for diverse groups of students in the elementary classroom as it pertains to science education.

### **Class Attendance Policy**

All attendance policies as stated in the current SWU handbook will be enforced. Please be on time to every class out of respect for your peers. Three tardies will equal one unexcused absence.

### **Academic Integrity**

The Honor Code is in effect for all assignments, in and out of class. The penalties will be enforced as stated in the handbook.

### **Late Work**

Lesson presentations and all activities will be due according to agreement between the instructor and individual students. Late work will be penalized by a deduction of **15 points**. No work can be accepted after the final day of the course.

### **Enduring Understandings**

1. The student will understand that teaching science is a multi-faceted endeavor.
2. The student will understand that as teachers they must use varied strategies to teach science.
3. The student will understand that science is a life skill.

**Grading Scale**

A	4.0
A-	3.7
B+	3.4
B	3.0
B-	2.7
C+	2.4
C	2.0
C-	1.7
D+	1.4
D	1.0
F	0.0
NC	No Credit (does not affect GPA)
P	Pass
S	Satisfactory completion, no credit toward graduation
I	Incomplete
W	Withdrew

**INTASC Standards, ACEI Standards, and ADEPT Performance Standards are referenced for each objective and activity.**

**Interstate New Teacher Assessment and Support Consortium (INTASC Standards)**

Principle #1: The teacher understands the central concepts, tools of inquiry, and the structures of the discipline(s) he or she teaches and can create learning experiences that make these aspects of subject matter meaningful for students.

Principle #2: The teacher understands how children learn and develop, and can provide learning opportunities that support their intellectual, social, and personal development.

Principle #3: The teacher understands how students differ in their approaches to learning and creates instructional opportunities that are adapted to diverse learners.

Principle #4: The teacher understands and uses a variety of instructional strategies to encourage students' development of critical thinking, problem solving, and performance skills.

Principle #5: The teacher uses an understanding of individual and group motivation and behavior to create a learning environment that encourages positive social interaction, active engagement in learning and self-motivation.

Principle #6: The teacher uses knowledge of effective verbal, nonverbal, and media communication techniques to foster active inquiry, collaboration and supportive interaction in the classroom.

Principle #7: The teacher plans instruction based upon knowledge of subject matter, the community, and curriculum goals.

Principle #8: The teacher understands and uses formal and informal assessment strategies to evaluate and ensure the continuous intellectual, social, and physical development of the learner.

Principle #9: The teacher is a reflective practitioner who continually evaluates the effects of his/her choices and actions on others (students, parents, and other professionals in the learning community) and who actively seeks out opportunities to grow professionally.

Principle #10: The teacher fosters relationships with school colleagues, parents, and agencies in the larger community to support students' learning and well-being.

Principle #11: The teacher demonstrates dispositions that promote scholarship within a Christian ethic of care. (not INTASC)

## **SPA Standards**

### **National Association for the Education of Young Children (NAEYC) Standards**

1. Promoting Child Development and Learning. Candidates use their understanding of young children's characteristics and needs, and of multiple interacting influences on children's development and learning, to create environments that are healthy, respectful, supportive, and challenging for all children.
2. Building Family and Community Relationships. Candidates know about, understand, and value the importance and complex characteristics of children's families and communities. They use this understanding to create respectful, reciprocal relationships that support and empower families, and to involve all families in their children's development and learning.
3. Observing, Documenting, and Assessing to Support Young Children and Families. Candidates know about and understand the goals, benefits, and uses of assessment. They know about and use systematic observations, documentation, and other effective assessment strategies in a responsible way, in partnership with families and other professionals, to positively influence children's development and learning.
4. Teaching and Learning. Candidates integrate their understanding of and relationships with children and families; their understanding of developmentally effective approaches to teaching and learning; and their knowledge of academic disciplines to design, implement, and evaluate experiences that promote positive development and learning for all children.
5. Becoming a Professional. Candidates identify and conduct themselves as members of the early childhood profession. They know and use ethical guidelines and other professional standards related to early childhood practice. They are continuous, collaborative learners who demonstrate knowledgeable, reflective, and critical perspectives on their work, making informed decisions that integrate knowledge from a variety of sources. They are informed advocates for sound educational practices and policies.

## **Association for Childhood Education International (ACEI) Standards**

### ***Development, Learning and Motivation***

1. 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.

### **CURRICULUM STANDARDS**

- 2.1 English language arts—Candidates demonstrate a high level of competence in use of English language arts and they know, understand, and use concepts from reading, language and child development, to teach reading, writing, speaking, viewing, listening, and thinking skills and to help students successfully apply their developing skills to many different situations, materials, and ideas.
- 2.8 Connections across the curriculum—Candidates know, understand, and use the connections among concepts, procedures, and applications from content areas to motivate elementary students, build understanding, and encourage the application of knowledge, skills, and ideas to real world issues.

### **INSTRUCTION STANDARDS**

- 3.1 Integrating and applying knowledge for instruction—Candidates plan and implement instruction based on knowledge of students, learning theory, subject matter, 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, problem solving, performance skills—Candidates understand and use a variety of teaching strategies that encourage elementary students' development of critical thinking, problem solving, and performance skills.
- 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. 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 Practices and behaviors of developing career teachers—Candidates understand and apply practices and behaviors that are characteristic of developing career teachers.
- 5.2 Reflection and evaluation—Candidates are aware of and reflect on their practice in light of research on teaching and resources available for professional learning; they continually evaluate the effects of their professional decisions and actions on students, parents, and other professionals in the learning community and actively seek out opportunities to grow professionally.

5.3 Collaboration with families—Candidates know the importance of establishing and maintaining a positive collaborative relationship with families to promote the academic, social and emotional growth of children.

5.4 Collaboration with colleagues and the community—Candidates foster relationships with school colleagues and agencies in the larger community to support students' learning and well-being.

### **Assisting, Developing, and Evaluating Professional Teaching**

**(ADEPT Performance Standards)**: In this course, APS standards 5, 6, and 7 are emphasized.

There are ten ADEPT Performance Standards for classroom-based teachers. For the purposes of ADEPT, the term *classroom-based teacher* refers to certified teachers of core academic subjects, related subjects (e.g., physical education, career and technology education), and special education. The term *classroom-based teacher* does not include special-area personnel (i.e., school guidance counselors, library media specialists, and speech-language therapists).

The ten ADEPT Performance Standards (APSs) for classroom-based teachers can be grouped into four broad categories, or domains:

#### ***Domain 1: Planning***

- APS 1 Long-Range Planning
- APS 2 Short-Range Planning of Instruction
- APS 3 Planning Assessments and Using Data

#### ***Domain 2: Instruction***

- APS 4 Establishing and Maintaining High Expectations for Learners
- APS 5 Using Instructional Strategies to Facilitate Learning
- APS 6 Providing Content for Learners
- APS 7 Monitoring, Assessing, and Enhancing Learning

#### ***Domain 3: Classroom Environment***

- APS 8 Maintaining an Environment That Promotes Learning
- APS 9 Managing the Classroom

#### ***Domain 4: Professionalism***

- APS 10 Fulfilling Professional Responsibilities

Each of these Performance Standards contains a set of *key elements*—the critical components of the standard. Although the key elements are essential to the standards, the examples that follow the key elements in this document are included for illustrative purposes only and are *not* to be considered all-inclusive, universal, or absolute indicator

**Response to Dispositions**: Courses in the School of Education seek to integrate the following dispositions:

- The teacher candidate demonstrates an ethic of care towards self by exhibiting a biblical approach to life that is demonstrated by a passion for learning.



- The teacher candidate demonstrates an ethic of care towards learners by displaying an enthusiasm about teaching as demonstrated by compassionate and respectful interactions with learners.
- The teacher candidate demonstrates an ethic of care towards colleagues by engaging in collaborative work practices as demonstrated by compassionate and respectful interactions with colleagues.
- The teacher candidate demonstrates an ethic of care towards the community by recognizing the community as an integral part of the learning process and demonstrated by valuing its pluralist nature.

**Of these four dispositions, this course emphasizes all dispositions**

***General Course Objectives Upon completion of this course, teacher candidates will be able to...***

<b>OBJECTIVES</b>	<b>Textbook chapter correlations</b>	<b>ACEI</b>	<b>ADEPT PS #</b>	<b>INTASC PRINCIPLES</b>
1. <u>Explicitly teach, assess, and reflect on best practices in science education</u> as they pertain to children grades 2-6, and the Christian ethic of care that guides students in their studies at Southern Wesleyan University.	All chapters	1, 2.1,	4 - 9	1, 2, 4, 7, 8, 11
2. Describe ways to create home/school connections that enhance the children's science learning opportunities.	8	5.3		9, 10
3. Create and teach units and lessons in science that facilitate learning for children of differing levels of needs and interests.	6	3.1 -3.5	2 - 9	1, 2, 3, 4
4. Explain how diversity of student interests and backgrounds of experience can enrich the science classroom experience for all children..	1-3	3.2		1, 2, 3, 5
5 Explain the importance and give examples of ways to establish and maintain high expectations for all students.	1-4	1		5
6. Adapt science teaching strategies for use with students who have special learning needs.	6	3.2, 3.3	2	6

## Coursework Submission Dates

You will be required to maintain a log of hours and reflections within a notebook as part of the field experience that is an important and integral part of this science course. The field experience will count for 25% of the course grade.

**All lesson plans to be presented in the practicum setting must be viewed before implemented in the practicum classroom setting.**

You will also be required to keep a class notebook.

	<b><u>Class Topics and Class Schedule</u></b> (Tentative Course Outline)
August 21	<ul style="list-style-type: none"> <li>• Go over Syllabus</li> <li>• Introduction to the course</li> <li>• Introduction to the textbook</li> <li>• Requirements for the course &amp; practicum</li> <li>• Course calendar</li> </ul>
August 26	<p><b>In Class:</b> Chapter 1- How Much Science Does the Elementary Science Teacher Need to Know? Pages 5-42</p> <p><b>Discuss Science Fair Plan</b></p> <p><b>For Next Class:</b> Complete Additional Questions on page 42 (numbers 1-2)</p>
August 28	<p><b>In Class:</b> Chapter 2- The Nature of Science pages 44-73</p> <p><b>For Next Class:</b> Complete Additional Questions on page 73 (numbers 5-6)</p>
September 2	<p><b>In Class:</b> Lesson Planning</p> <p><b>For Next Class:</b> Come up with ideas for a lesson and bring it to class- be prepared to discuss the standard, objective, procedures, higher level thinking questions, etc.</p>
September 4	<p><b>In Class:</b> Lesson Planning- go over lesson ideas/ professor will give feedback</p> <p><b>For Next Class:</b> Lesson Plan 1 of Unit</p>
September 9	<p>Work on Unit In Class</p> <p><b>For Next Class:</b> Work on Unit</p>
September 11	<p>Work on Unit In Class</p> <p><b>For Next Class:</b> Work on Unit</p>
September 16	<p>Work on Unit In Class</p> <p><b>For Next Class:</b> Work on Unit</p>
September 18	<p>Work on Unit In Class Work on Experiment In Class</p> <p><b>For Next Class:</b> Work on Unit and Experiment</p>

September 23	<p><b>In Class:</b> Chapter 3- The Processes of Science pages 77-193</p> <p>Chapter 4- Constructivism in Elementary Science Education pages 197-239</p> <p><b>Discuss Journal Article Assignment</b></p> <p><b>For Next Class:</b> Complete Chapter 3 Case Study &amp; Additional Questions on page 239 (number 2)</p>
September 25	<p>Work on Unit In Class</p> <p><b>For Next Class:</b> Work on Unit</p>
September 30	<p><b>Unit Due</b></p> <p><b>Experiment Due- Teach to Class</b></p> <p><b>For Next Class:</b> Journal Articles Due</p>
October 2	<b>Journal Articles (3) Due- Share with Class &amp; Finish Experiments</b>
October 14	<p><b>In Class:</b> Chapter 5- Inquiry pages 242-277</p> <p><b>Discuss Group Experiment Assignment</b></p> <p><b>For Next Class:</b> Complete Chapter 5 Case Study, Work on Group Experiment Assignment</p>
October 16	Work on Group Experiment Assignment
October 21	Work on Group Experiment Assignment
October 23	<b>Group Experiment Assignment Presentations</b>
October 28	<p><b>In Class:</b> Chapter 6- Some Differences in the Ways Children Learn pages 280-304</p> <p><b>For Next Class:</b> Complete Additional Questions on page 304 (numbers 1- 2)</p>
October 30	<p><b>In Class:</b> Chapter 7- Gender Bias pages 307-335</p> <p><b>For Next Class:</b> Complete Additional Questions on page 334 (number 3)</p>
November 4	Work on Science Fair Plan with Visual
November 6	<p><b>In Class:</b> Chapter 8- Authentic Assessment pages 339-382</p> <p><b>For Next Class:</b> Complete Additional Questions on page 382 (number 1)</p>
November 11	<p><b>In Class:</b> Chapter 9 – The Elementary Science Classroom pages 384-425</p> <p><b>For Next Class:</b> Complete Additional Questions on page 425 (numbers 1-2)</p>
November 13	<p><b>In Class:</b> Chapter 10- Reading Writing &amp; Literature pages 431-469</p> <p><b>For Next Class:</b> Bring in Two Children's Books Related to Your Grade Level and Standards- Complete a Written Review of Each Book</p>
November 18	<b>Lesson Plan</b>

<b>Should be Taught By This Date in Practicum</b>	Work on Science Fair Plan with Visual
November 20	<p><b>Two Written Book Review Due- Share with Class</b></p> <p><b>Book Walk</b></p> <p><b>In Class:</b> Chapter 11- Technology in Elementary Science Education pages 473-512</p> <p><b>Class Notebook Due</b></p> <p><b>For Next Class:</b> Each group researches 5 science related websites for the elementary classroom- write the website and a brief explanation of the website- have copies ready for classmates</p>
November 25	<p><b>Websites Due- Each Group will Share with the Class</b></p> <p><b>In Class:</b> Chapter 12 Concept Mapping</p>
December 2	<ul style="list-style-type: none"> <li>• <b>Share Science Fair Plan with Visual</b></li> <li>• <b>Practicum notebook due with all materials, make a copy of time sheet for practicum notebook (Field experience will count for 25% of the final grade). Golden time sheet and teacher evaluation due to Ms. Findley.</b></li> </ul>

Due Date	Assignment & Explanation	Points possible for this assignment
September 30	Thematic unit with five lessons- one lesson must be an experiment	20
October 2	3 Journal Articles	10
October 23	Group science experiment	5
November 20	Two Book Reviews	5
November 20	Class Notebook, Case Studies	10
November 25	5 Websites	5
<b>This will be worked out with your co-operating teacher. It must be completed by November 18</b>	Teach one (1) lesson with a lesson plan for science in field experience placement classroom. This lesson must be turned in for review by the professor before being taught.	10
December 2	Science Fair Plan	10
December 2	Field experience notebook with copy of time sheet, teacher evaluation, lesson plan taught in placement, and typed reflections	25

## Field Experience

The field experience will help to prepare you; to enter learning communities rather than to be isolated in classrooms; for the opportunity to experience a full range of a teacher's responsibility; to teach diverse students and to advance the skills and knowledge of each student in the classroom. You must keep a field experience notebook with a time log and reflections. **A typed reflection must be completed after each visit.** Golden time sheet and teacher evaluation must be turned into Ms. Finley (**Make a copy for your field experience notebook**). **A total of 36 hours of field placement experience is required. The field placement will count for 25% of the final grade in the course.**

## Unit Plan

Unit must be across the curriculum with five (5) lesson plans. Unit must be in a notebook. Lesson plans should be done on the SWU lesson plan format. You will present one of the lessons to the class (experiment lesson). Early finishers/enrichment activities must be science related.

## Class Notebook

Class handouts, notes, group work, and any other material presented in class must be in the notebook. Each section of the notebook must be tabbed. A copy of the unit must also be in the notebook. Guidelines for the notebook are below.

<b>Notebook (three hole binder) should include the following information</b>	
1. Title page that includes course information, your name, semester of course, professor, statement "in partial fulfillment of course requirements."	1
2. Syllabus, all scoring guides provided in the course, and SC Standards for your grade level in Science,	1
3. Unit	3
4. Chapter activities done in class Each section is tabbed	5
Notebook contents: (total possible 10 points)	/10

## Articles

Read and critique three (3) articles from current issues from Science journals. Write a one page review of each article, and reflect on its value. Summarize and reflect on the article as it pertains to you when you enter the classroom. The following rubric will be used to grade each article. APA formatting should be used for Articles.

CATEGORY	4	3	2	1
<b>Identifies important information</b>	Student lists all the main points of the article without having the article in front of him/her.	The student lists all the main points, but uses the article for reference.	The student lists all but one of the main points, using the article for reference. S/he does not highlight any unimportant points.	The student cannot identify important information with accuracy.
<b>Identifies details</b>	Student recalls several details for each main point without referring to the article.	Student recalls several details for each main point, but needs to refer to the article, occasionally.	Student is able to locate most of the details when looking at the article.	Student cannot locate details with accuracy.
<b>Summarization</b>	Student uses only 1-3 sentences to describe clearly what the article is about.	Student uses several sentences to accurately describe what the article is about.	Student summarizes most of the article accurately, but has some slight misunderstanding.	Student has great difficulty summarizing the article.
<b>Citation</b>	Student formats all citations correctly.	Most of the citation information is correct.	Some of the citation information is correct.	Student has great difficulty citing the article.

## **Science Fair Plan**

You will pretend you are the Science Coordinator for your school. You have to plan a Science Fair for the entire school (3<sup>rd</sup>-5<sup>th</sup> grades).

- What will you do to prepare students for the Science Fair
- How will you market the Science Fair to parents and the Community?
- What will you do about students that do not have support at home to assist with his/her experiment?
- Where will your science fair be held?
- Who will judge the experiments?
- What prizes will the winners receive? What about the other students that do not win? How much will this cost? Who will pay for it?
- How will you make it fun and exciting for students?
- Who will you get to help you?

This must be in a notebook/folder. A visual (board, pictures, diagrams) must be included in your plan.