## COURSE SYLLABUS

<table>
<thead>
<tr>
<th>Course Number: SCE 3811 301</th>
<th>Elementary Science  (3) Lectures and laboratory experiences designed to provide opportunities to acquire techniques for teaching science to children and young adolescents and to develop learning activities and instructional units for classroom use</th>
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<tr>
<td>Prerequisite(s):</td>
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<tr>
<td>Course Credit: 3 Lecture, Laboratory, Demonstration</td>
<td>Course Hours: 5:00pm-6:45 pm T/TR</td>
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<tr>
<td>College: Education</td>
<td>Required Text(s):</td>
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| Prerequisites: BSC 1005 & PSC 1121 | Sciencesaurus K-8 grades Red, Blue, & Green Books  
Great Source Education Group, a division of Houghton Mifflin Company |
| Department Elementary Education | Foundations of Earth Science - 5th Edition  
Book Author: Lutgens and Tarbuck |
| College of Education        | Supplies: A three ring binder, lose leave paper                                                                                                                                                                                                               |
| FAMU Old DRS Bldg 8         | Resources: Florida Curriculum Framework:  
Science for All Students, the Florida PreK-12 Science Curriculum Framework, Department of Education.  
Teaching Science Through Discovery by Arthur Carin & Robert Sund |
| Florida A&M University      |                                                                                                                     |
| Tallahassee, FL 32307       |                                                                                                                     |
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Place and Time: FAMU Old DRS Bldg 64 RM 113                                                                                                                  |
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e-mail: edith.davis@famu.edu |
<table>
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<tr>
<th>Office Hours</th>
<th>Monday</th>
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Course Description

This is a course to prepare prospective elementary school teachers to teach science. The course includes the study of the nature of science and the scientific method; the directions and goals of science teaching (the Science Sunshine State Standards and the National Science Education Standards); the implications of recent research findings in cognitive research, constructivism, and instructional strategies that promote science processes and higher order thinking such as concept mapping, teaching to learning styles and multiple intelligences, alternative assessment strategies, cooperative learning, and brain-based teaching and learning; thematic units; laboratory safety; classroom management; planning science instruction; integration of technology in science instruction; and avenues for professional development. This course prepares preservice students to teach science to all children including those with varying exceptionalities, i.e., gifted, learning disabled, and other children that are economically, socially, culturally and linguistically different (ESOL).

Elementary Science

To foster the development of prospective elementary teachers with a significant science content background and appropriate skills to deliver science instruction meaningfully to all students including students with special needs, varying exceptionalities and speakers of languages other than English (ESOL). Emphasis will be placed on approaches and strategies that promote active learning and higher order thinking skills. Topics will include effective planning, teaching strategies, materials and procedures, evaluation, reflective practice and professional participation.

Overall Goal of the Course

The student will be able to take a science lesson and design instructional strategies and activities that:

1. address the Sunshine State Science Standards and the National Science Education Standards (NCATE 1.1, 1.2, 1.3, 1.4, 2.1, 2.2, 2.3, 2.4, 6.1, 6.2; FEAP #2, #4, #8, #10);
2. enable students to conduct science investigations in a manner that communicates the dynamic and evolving nature of science, connects knowing to finding out, and communicates the significance of the collection and the use of evidence (NCATE 1.3, 2.1, 2.2, 2.3, 2.4, 3.1, 3.2, 3.3, 3.4, 4.3; FEAP #4);
3. are developmentally appropriate and utilize the constructivist approach to promote curiosity, interest and learning in science among students (NCATE 3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 5.1, 5.2, 5.3, 5.4, 5.5; FEAP #5, #7);
4. engage students actively to provide for the development of problem-solving skills, i.e., observing, predicting, identifying and controlling variables, designing experiments, testing hypothesis, verifying predictions, interpreting data and graphs, making inferences, communicating results, etc. (NCATE 2.1, 2.2, 2.3, 2.4, 3.1, 3.2, 3.3, 3.4; FEAP #4);
5. apply techniques of cooperative learning, authentic assessment, classroom management, and making allowances for different learning styles and varying exceptionalities, concept mapping, and multiple intelligences (NCATE 5.1, 5.2, 5.3, 5.5, 8.1, 8.2, 8.3; FEAP #2, #5, #7, #9; ESOL 1, 8, 15, 17, 22, 24);
6. integrate technology in science classroom instruction such as the use of laserdiscs, internet, e-mail, CD-ROM etc. (NCATE 4.1, 4.2, 5.4, 7.1, 7.2, 7.3; FEAP #8, #10, #12);
7. illustrate the relationship among science, technology and society; and enhance awareness about environmental problems (NCATE 4.1, 4.2, 4.3, 5.4; FEAP #8, #12);
8. provide for authentic methods of evaluating student progress that reflect the goals of science education (NCATE 8.1, 8.2, 8.3; FEAP #1, #2; ESOL 8, 15, 17, 22, 24);
9. capitalize on community resources and state and local expertise where applicable (NCATE 7.1, 7.2, 7.3; FEAP #10, #11);

10. create a well managed and safe environment for learning science (NCATE 5.3, 9.1, 9.2, 9.3, 9.4; FEAP #6, #9, #10);

11. integrate the science activity with other disciplines (NCATE 4.1, 4.2, 5.1, 6.1, 6.2, 7.1, 7.2, 7.3; FEAP #8; ESOL 8, 15, 17, 22, 24; ESOL 8, 15, 17, 22, 24); and

12. demonstrate appropriate instructional strategies in a clinical setting (NCATE 10.1, 10.2, 10.3, 10.4; FEAP #2, #3, #4, #10; ESOL 8, 15, 17, 22, 24).
A. Nature of Science

B. Sunshine State Standards and the National Science Education Standards
   1. Background and Rationale
   2. Goals for Curriculum and Interdisciplinary Unit Development
   3. Instructional Strategies and Authentic Assessment
   4. Florida Comprehensive Assessment Test

C. Science investigations geared toward
   1. experiencing thought process development in science;
   2. defining intellectual process skills developed through science;
   3. knowing what science is, how scientific knowledge develops and undergoes change and how it affects the individual and society; and
   4. meeting the needs of all children including those that are gifted, those that are physically handicapped, and those with varying exceptionalities such as those that are culturally, economically, socially and linguistically different (ESOL)

D. Research studies on:
   1. cognitive development of children;
   2. cooperative learning and curriculum integration;
   3. studies that promote conceptual learning, i.e., concept mapping, questioning techniques, brain-based teaching and learning, authentic assessment, thematic learning, providing for learning style differences and multiple intelligences with special emphasis on culturally and linguistically diverse students (ESOL); and
   4. how misconceptions are acquired by students.

E. Strategies for promoting curiosity and interest in, and understanding of science such as the utilization of
   1. hands-on experiences;
   2. classroom demonstrations;
   3. discrepant events;
   4. strategies to promote conceptual learning, i.e., concept mapping, questioning strategies, teaching to learning styles and intelligences;
   5. cooperative learning;
   6. thematic learning; and
   7. science projects, field trips and science fairs.

F. Designing, implementing and evaluating science activities in the classroom:
   1. selecting and designing developmentally appropriate activities and activities that meet the needs of all students with emphasis on culturally and linguistically diverse students (ESOL);
   2. planning strategies to promote curiosity, interest, student involvement, and higher order thinking skills;
   3. rubrics development for assessment with special emphasis on culturally and linguistically diverse students (ESOL); and
   4. lesson plan development

G. Designing an integrated curriculum unit around a unifying theme consisting of:
   a. an Overall Integrated Unit Planning Guide including:
      1. Essential Questions
      2. Instructional Activities outline
      3. Resources
      4. Culminating Products, Projects, Exhibitions
      5. Rubrics for Assessment
b. Subject Area Tool Guides for Science, Mathematics, Language Arts and Social Studies including:
   1. Sunshine State Benchmark Codes
   2. Thinking Skills and Habits of Mind
   3. Purpose
   4. Content Activities
   5. Instructional Strategies

1. Computer applications in the science classroom
   1. Interactive Video, CD-ROM
   2. Interfacing Devices for Data Collection and Interpretation
   3. Email and Internet

2. Safety in the laboratory and classroom
   1. Caring for Plants and Animals in the Classroom
   2. Safety Precautions with Chemicals and Equipment

3. Classroom management and Discipline

Course Purpose

Introduce the essential Elementary Science Concepts (3) Lectures and laboratory experiences designed to provide opportunities to acquire techniques for teaching science to children and young adolescents and to develop learning activities and instructional units for classroom use.

The Whole Student

A holistic approach will be the most intensive and enriching experience for the students. The students will learn that the subjects of Elementary Science Education and Earth/Space Science can impacts all spheres of their lives. We are teaching the whole person. We must understand that when we are teaching Elementary Science Education and Earth/Space Science, we will also teach the student life skills and that Elementary Science Education and Earth/Space Science should be fun and relevant to the students’ world.

We must understand that that teaching Elementary Science Education and Earth/Space Science curriculum will be teaching scientific process skills such as observing, communicating, classifying, estimating, measuring, inferring, predicting, making operational definitions, making and using models, formulating questions and hypotheses, collecting and interpreting data, identifying and controlling variables, and experimenting. The curriculum will also teach students about accountability and responsibility, time management, respect for others as well as for oneself. These are scientific process and life skills that will not only help the student to be the best they can be during the semester, but throughout their life.

Elementary Science Education and Earth/Space Science is important to our children’s understanding of the natural world they live in and the scientific laws that help make the natural world livable. Children that have an understanding of their world can be true contributors. The studies of the sciences are essential to rounding out a child’s education. The natural world that the child lives in has a direct impact on the child’s health and well being.

A child understanding of the natural world and the scientific laws that govern it will enable him or her to be able to find solutions to some of the most pressing issues that face our world. Today’s problems include maintaining clean water and air, sustaining quality food supplies, and finding cures for certain diseases.
Science Objectives

**Objective (Psychomotor)**
By the end of the curriculum unit, students will utilize the methods of scientific process skills such as observing, communicating, classifying, estimating, measuring, inferring, predicting, making operational definitions, making and using models, formulating questions and hypotheses, collecting and interpreting data, identifying and controlling variables, and experimenting.

**Objective (Affective)**
By the end of the curriculum, students will appreciate student engagement in the culturally diverse classroom which is promoted by accepting unique learner responses, reducing competitiveness, promoting peer interaction, and conveying a sense of nurturing and caring.

**Objective (Cognitive)**
By the end of the curriculum, students can create, evaluate, synthesis, analysis, apply, comprehend and have knowledge of scientific data.

**I. EXPANDED COURSE DESCRIPTION**

Frequently, science instruction is overlooked in elementary school classrooms, losing out to the perceived “core” subjects of language arts and mathematics. When science is taught at all, material is too frequently presented as a collection of vocabulary and facts, names and dates, read from a textbook, and then filled in on a worksheet. This approach to science teaching was never adequate and today is completely unsatisfactory. The primary goal of the Content Area Instruction course is to explore how science, when presented as a process of inquiry-based problem solving, can support high quality interdisciplinary learning across all the content areas. As science become a part of the “high stakes” in the context of the FCAT exam, the subject is about to reemerge as essential parts of the elementary school curriculum. The model of science teaching and learning presented in this class will serve to prepare students to succeed on the FCAT exam, while also emphasizing active and meaningful problem solving. In the same way that learning to decode text without developing reading comprehension or learning mathematical algorithms without understanding mathematical principles are unsatisfactory student outcomes, memorizing scientific vocabulary without understanding what science is or how it is practiced will not prepare students for the scientific and technological world in which they will live.

Learning to be an effective science teacher comes with practice, experience, and a willingness to experiment with new approaches. Elementary teachers must be generalists rather than specialists, thus, deep science content knowledge is not essential to being a good elementary teacher (although it is certainly helpful). A willingness to engage in inquiry and exploration and to model problem-posing and problem-solving along with your students is essential. These are the skills that we will be practicing throughout this course. One of my goals as your instructor is to model the practices that I expect you to use in your own classroom. If you don’t currently view science as subjects that is important, engaging, and fun, I hope that you will come to see them that way by the end of this course.
Conceptual Framework

The Conceptual Framework in the Professional Education Unit (PEU) at Florida A&M University is an integrated approach to providing educational experiences that result in exemplary professional educators. The Framework is comprised of six themes with the mission of developing high quality classroom teachers, administrators and support personnel. The term “exemplary” refers to the kind of graduates the PEU strives to produce. The figure below provides a diagram of the Exemplary Professional Conceptual Framework.

DIVERSITY

• **CF 1**
  • Through this focal area, the FAMU professional education candidate will:

| CF: 1.1 (K) | Understand diverse backgrounds of individuals. | F: 5,6,7 | I: 3 |
| CF: 1.2 (S,D) | Acquire skills & dispositions to understand & support diverse student learning. | F: 5,7 | I: 3,8 |
| CF: 1.3 (S,D) | Accept and foster diversity. | F: 5,6 | I: 3,8 |
| CF: 1.4 (S) | Practice strategies such as: acceptance, tolerance, mediation & resolution. | F: 5,6 | I: 3 |
| CF: 1.5 (K, S) | Establish a comfortable environment in which all students can learn. | F: 5, 7, 9, 10 | I: 5 |

TECHNOLOGY

• **CF 2**
  • Through this focal area, the FAMU professional education candidate will:

| CF: 2.1 (S) | Use of available technology and software to support student learning. | F: 4,12 | I: 6 |
| CF: 2.2 (S) | Use technology to manage, evaluate and improve instruction. | F: 1,4,10, 12 | I: 6,7 |
| CF: 2.3 (K) | Knows fundamental concepts in technology. | F: 12 | I: 1,6 |
| CF: 2.4 (K) | Understands fundamental concepts in technology. | F: 2,12 | I: 6 |
| CF: 2.5 (S) | Use fundamental concepts in technology. | F: 12 | I: 6 |
| CF: 2.6 (S,D) | Facilitates access to technology for students. | F: 12 | I: 6 |
| CF: 2.7 (S) | Facilitate the use of technology by students. | F: 4,12 | I: 6 |

### VALUES

**•CF3**

**•Through this focal area, the FAMU professional education candidate will:**

| CF: 3.1 (S) | Work with colleagues in a professional manner. | F: 6 | I: 2,5 |
| CF: 3.2 (S) | Interact with students, families and other stakeholders in a manner that reflects ethical and moral standards. | F:11,6 | I: 9,10 |
| CF: 3.3 (S,D) | Show respect for varied (groups) talents and perspectives. | F: 5,6 | I: 3 |
| CF: 3.4(D) | Be committed to individual excellence. | F: 3,9 | I: 5,9 |
| CF: 3.5(D) | Recognize the importance of peer Relationships in establishing a climate for learning. | F: 7,2 | I: 5,10 |
### CRITICAL THINKING

**CF4**

- Through this focal area, the FAMU professional education candidate will:

| CF: 4.1 (K) | Understand a variety of instructional/professional strategies to encourage students’ development of critical thinking and performance. | F:4,7 | I: 4 |
| CF: 4.2 (S) | Use a variety of instructional/professional strategies to encourage students’ development of critical thinking and performance. | F:2,7 | I: 4 |
| CF: 4.3 (D) | Values critical thinking and self-directed learning as habits of mind. | F: 4 | I: 1,4 |
| CF: 4.4 (K) | Acquire performance assessment techniques and strategies that measure higher order thinking skills of student. | F:1,4 | I: 1,8 |
| CF: 4.5 (S) | Demonstrate the use of higher order thinking skills. | F: 8 | I: 4 |

### PROFESSIONALISM

- **CF 5**
- Through this focal area, the FAMU professional education candidate will:

| CF: 5.1 (K) | Know the content | F: 8 | I: 1 |
| CF: 5.2 (S) | Use the appropriate pedagogy to provide all students with the opportunity to learn. | F:7,9 | I: 7 |
| CF: 5.3 (D) | Demonstrate commitment to professional growth & development. | F:3,7 | I: 9 |
| CF: 5.4 (K,S) | Use major concepts, principles, theories & research related to the development of children and adults. | F: 7 | I: 2 |
| CF: 5.5 (S) | Construct learning opportunities that support student development & acquisition of knowledge & motivation. | F: 7 | I: 5 |
| CF: 5.6 (S) | Display effective verbal & non-verbal communication techniques to foster valuable interaction in the classroom. | F: 2 | I: 6 |
| CF: 5.7 (S,D) | Display appropriate code of conduct including dress, language, and respective behavior. | F: 9 | I:5,9 |
| CF: 5.8 (K,S) | Know and use student personnel services | F:5,10,12 | I: 2,10 |

### URBAN/RURAL EDUCATION

**CF6**

- Through this focal area, the FAMU professional education candidate will:

| CF: 6.1 (S) | Be able to work in school settings with varied levels of human and material resources. | F:9,10,11 | I: 10 |
| CF: 6.2 (S,D) | Be able to work in school settings that focus on rural/urban context with opportunities and challenges that these environments provide. | F: 11 | I: 3 |
| CF: 6.3 (K) | Understand the conditions of both rural and urban students and families. | F: 5, 11 | I: 2,3 |
| CF: 6.4 (S) | Communicate effectively with students’ parents and the community. | F: 5,11 | I: 6 |
Overall Goals of the Course

Objectives

Upon completing this course, you should be able to:

1) Design, teach and assess inquiry-based science.
2) Explain each of the top (letter) level strands of the Sunshine State Standards for science as well as representative standards within each strand
3) Defend your classroom curricular, instructional and assessment decisions for science in relation to FCAT pressures
4) Make connections between standards-based content, student lived experiences, and issues of equity and social justice
5) Understand and explain how students reason and construct meaning during inquiry tasks and what this understanding implies for your teaching of science.
6) Use a range of educational technologies in your teaching of science.
7) Synthesize and apply all of the above in the context of the final.

Specific Performance Objectives

The student will be able to take a science lesson and design instructional strategies and activities that:

13. address the Sunshine State Science Standards and the National Science Education Standards (NCATE 1.1, 1.2, 1.3, 1.4, 2.1, 2.2, 2.3, 2.4, 6.1, 6.2; FEAP #2, #4, #8, #10);

14. enable students to conduct science investigations in a manner that communicates the dynamic and evolving nature of science, connects knowing to finding out, and communicates the significance of the collection and the use of evidence (NCATE 1.3, 2.1, 2.2, 2.3, 2.4, 3.1, 3.2, 3.3, 3.4, 4.3; FEAP #4);

15. are developmentally appropriate and utilize the constructivist approach to promote curiosity, interest and learning in science among students (NCATE 3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 5.1, 5.2, 5.3, 5.4, 5.5; FEAP #5, #7);

16. engage students actively to provide for the development of problem-solving skills, i.e., observing, predicting, identifying and controlling variables, designing experiments, testing hypothesis, verifying predictions, interpreting data and graphs, making inferences, communicating results, etc. (NCATE 2.1, 2.2, 2.3, 2.4, 3.1, 3.2, 3.3, 3.4; FEAP #4);

17. apply techniques of cooperative learning, authentic assessment, classroom management, and making allowances for different learning styles and varying exceptionalities, concept mapping, and multiple intelligences (NCATE 5.1, 5.2, 5.3, 5.5, 8.1, 8.2, 8.3; FEAP #2, #5, #7, #9; ESOL 1, 8, 15, 17, 22, 24);

18. integrate technology in science classroom instruction such as the use of laserdiscs, internet, e-mail, CD-ROM etc. (NCATE 4.1, 4.2, 5.4, 7.1, 7.2, 7.3; FEAP #8, #10, #12);

19. illustrate the relationship among science, technology and society; and enhance awareness about environmental problems (NCATE 4.1, 4.2, 4.3, 5.4; FEAP #8, #12);

20. provide for authentic methods of evaluating student progress that reflect the goals of science education (NCATE 8.1, 8.2, 8.3; FEAP #1, #2; ESOL 8, 15, 17, 22, 24);

21. capitalize on community resources and state and local expertise where applicable (NCATE 7.1, 7.2, 7.3; FEAP #10, #11);

22. create a well managed and safe environment for learning science (NCATE 5.3, 9.1, 9.2, 9.3, 9.4; FEAP #6, #9, #10);
23. integrate the science activity with other disciplines (NCATE 4.1, 4.2, 5.1, 6.1, 6.2, 7.1, 7.2, 7.3; FEAP #8; ESOL 8, 15, 17, 22, 24; ESOL 8, 15, 17, 22, 24); and

24. demonstrate appropriate instructional strategies in a clinical setting (NCATE 10.1, 10.2, 10.3, 10.4; FEAP #2, #3, #4, #10; ESOL 8, 15, 17, 22, 24).

**Making Science Meaningful to Students**

*The Learner*

It should be teachers’ objective to demystify science and make it transparent for all to understand. It is also my objective to make science fun and relevant to the students’ world. Teachers should plan to model the five key behaviors of an effective teacher which are to make lessons clear, to provide instructional variety, to be task oriented, to engage students, and to increase student’s learning success rates. Teachers should also be using some of the helping behaviors such as using student ideas and contributions, as well as structuring their curriculum, units, and lessons plans so that the students will find information easy to learn. I will use various questioning and probing methods to energize the classroom environment. But, even after following the behavior models and methods, Teachers only become an effective teacher by truly caring about the students and the subject that they are teaching.

Teachers should recognize that we have a very diverse group of students to teach and it is our role to understand our students and their different learning styles whether they are global learners and look at the world holistically (field dependent or sensitive) or whether they look at the world in discrete parts (field independent or insensitive). Understanding this about our students will help us to strategize the best ways to teach and to maximize their educational experience. Knowing how students obtain information will help us to plan to use the best learning structures. Because task-relevant facts, skill and understanding of science comes in many different ways, Teacher should use various structures such as general to detail, simple to complex, abstract to concrete or conceptual to procedural to ensure the scientific content imparted through the lessons will enhance the students’ learning experience.

Teachers should plan on trying to have a bias free environment so that learning will not be prohibited in anyway. Teachers should continuously keep a check on themselves and solicit feedback. The teachers’ intent should be to have an environment of trust and mutual respect for one another. Teachers should understand it is a privilege to teach young children.

Teachers should understand that there will be internal and external forces that will try to stop them from creating such an environment, but teachers’ purpose should be to defeat those forces. Some internal forces I know teacher will have to face will be the students learning anxieties and poor self concepts. Teachers will also have to deal with the students who feel rejected by the education system. To overcome these debilitating forces, it should be the teachers’ goal to have a "thinking curriculum, one that focuses on teaching learners how to think critically, reason, and problem solve in real world contexts."¹ This goal includes tapping into the students’ families whenever possible so that the learning process can be reinforced at home. Teachers’ objectives should be clear and should have specific learning outcomes. With a set goal and objectives, Teachers should seek to work their way through the entire taxonomy of educational objectives from the lowest level (less authentic) to the highest level (more authentic) for the cognitive, affective, and the psychomotor domains of the students.

Teachers should focus on particular issues occurring in the science world and bring it into the world of their students. Teachers should become a subject matter expert on these issues and Teachers should use a system

¹ Borich, Effective Teaching Methods (Prentice-Hall, Inc. (2000)) page 82.
perspective to translate that knowledge into unit and lesson plans. Teachers should translate the science curriculum into the unit plan and into bite size lesson plans that can be easily consumed by their students. The desired outcome of the unit and lesson plan is not just for the student to become subject matter experts but to develop essential learning skills. The essential learning skills can be identified as follows: A). Skills in acquiring data through the senses; B). Classification skills in ordering and sequencing data; C). Skills in oral and written communication of data in appropriate form; D). Skills of concepts and measurement using relationships and standards; and E). Skills in drawing logical inferences, predicting outcomes, and forming generalized statements.

To ensure that the desired behavior/outcomes are achieved, Teachers should use prompting in all of its forms, modeling, feedback, correction, independent practices and review. Teachers should instruct the students how to discriminate/generalize facts and concepts. Teachers should give the students the benefits of inductive and deductive reasoning processes. Teachers should guide the students to search and discover by using questions. Teachers should instruct students on how to self-evaluate themselves so that they will be responsible for their own learning. Teachers should instruct give their student continuous feedback and assess them periodically so that the desired outcomes of the four essential learning skills are achieved.

Teachers should understand that they must gain the student attention, direct them to the frequencies where the knowledge is being transmitted, elicit the desired behavior, give the feedback and assess the behavior. Teachers’ objective should be attention, retention, production and motivation. In the mist of these objectives, teachers should try never to lose sight that this should be fun.

**The Subject Content**

Clear communication of the unit and lesson plans is essential. Teachers that give instruct on facts should, then use the hierarchical approach or vertical unit planning could be most effective. If teachers are giving instruct on concepts, abstractions, and patterns, then lateral unit planning will be more applicable. It should be the teachers’ aim to provide students with alternate methods and new technologies. Teachers should use every tool at their disposal such as learning materials, games, simulations tutoring, computers, videos, CD-ROMs, and the minds of the students.

Another component to clearly communicating unit and lesson plans is determine by the categories of teaching/learning and desired outcomes. The two category types are: 1). Facts, Rules and Action sequences; and 2). Concepts, Patterns, and Abstract actions. Both categories are needed in the study of science. Regardless of the category type, retention, student learning success rate, or students achievement outcomes are the same. The category types put the information in the desired format that can be understood by the students. Researchers have proven that students who actively engaged in responding approximately 75% of the time will be higher achievers, one of the desired outcomes. In other words, choosing the proper teaching category helps to achieve the desired outcome.

The end result of all these activities is that science will be transparent and perceived as relevant to each student, and in conclusion making science meaningful to students.

**The science curriculum should address county, state and or national standards**

Science curriculum unit should meets and in some cases exceed the state and national standard. **The National Science Education Standards**

National Science Education Standards exist for 1) content, 2) teaching, 3) assessment, 4) program, and 5) system.

- **Content Standards** define what all students should understand and be able to do as a result of their school learning experiences. They are voluntary, not federally mandated nor reducible to a set of minimum competencies.
- **Teaching Standards** provide a vision of what teachers need to understand and do to provide
learning experiences for students that are aligned with content standards. They do not describe one best way to teach or learn.

- **Assessment Standards** identify essential characteristics of fair and accurate student assessments and program evaluations that are consistent with content standards at the classroom, school, district, state, and national levels. Assessment standards are not tests nor do they describe a single strategy to judge student learning or a school program.

- **Program Standards** describe how content, teaching, and assessment are coordinated in school practice over a full range of schooling to provide all students the opportunity to learn science.

- **System Standards** describe how policies and practices outside of the immediate learning environment support high quality science programs.

**Content Standards**
The Content Standards are broken down for grades K-4, 5-8, and 9-12 into seven categories. These categories are: Science as Inquiry, Physical Science, Life Science, Earth and Space Science, Science and Technology, Science in Personal and Social Perspectives, and the History and Nature of Science. An eighth category, Unifying Concepts and Processes, is not broken down into grade levels, but should be developed over the entire K-12 science experience.

- **Science as Inquiry Standards** are the basic and controlling principles in the organization and experiences in students’ science education. The standards on inquiry highlight the ability to do inquiry, which goes well beyond just using process skills such as measuring, observing, communicating, controlling variables, inferring, and experimenting. The Science as Inquiry Standards include the “processes of science”, but go beyond by requiring that students combine process skills and scientific knowledge as they incorporate scientific reasoning and critical thinking to help develop their understanding of science. Today’s students need to develop the ability to ask for information to use in answering questions; plan and conduct scientific investigations; use appropriate tools and equipment and experiences to extend their senses; and gather, analyze, and interpret data. Inquiry also includes using data and experiences to construct reasonable explanations and communicating about investigations and explanations.

- **Physical, Life, and Earth and Space Science Standards** express the primary subject matter of science. Science subject matter focuses on those science concepts, principles, and theories that are fundamental for all students to know and be able to use.

- **Science and Technology Standards** establish useful connections between the natural world and the designed world and offer essential decision-making abilities.

- **Science in Personal Social Perspectives Standards** connect students with their social and personal world. In the elementary grades, these standards include personal health, environmental change, and science and technology in local challenges and society.

- **History and Nature of Science Standards** include an understanding of the nature of science and uses history in school science programs to clarify different aspects of scientific inquiry, science in society, and the human aspects of science.

- **Unifying Concepts and Process Standards** provide students with powerful ideas that help them understand the natural world. These conceptual and procedural schemes that are integral to students’ science learning experiences and include concepts and processes such as systems, organization, interactions, change, measurement, models, scale, adaptation, and explanation.

Taking these standards into account, science curriculum should meet and some cases exceed the National Science Education Standards. The science curriculum should be aligns with the structure of the
Content Standards of the National Science Education Standards for the targeted grade. The subject matter is divided into four units: Life Science, Physical Science, Earth Science, and Human Body. Correlation of each unit to the National Science Education Standard Content Standards can be found in the Planning Guide that begins each unit. Hands on activities throughout the curriculum support the goals of the Science as Inquiry standards. Correlation of all Investigate and Experiment Activities to the Content Standards is provided. Extended Inquiry activities begin every unit. These activities follow methods of scientific inquiry suggested in the Science and Inquiry standards. Other features such as field trips, labs, Cross-curriculum assignments provide connections to the other National Science Education Standards Content Standards: Science and Technology; Science in Personal and Social Perspectives; History and Nature of Science; and Unifying Concepts and Principles.

**NSES science standards categories:**
- Standards for science teaching
- Standards for professional development for teachers of science
- Standards for assessment in science education
- Standards for science content
- Standards for science education programs
- Standards for science education systems

Each category of the NSES science standards is discussed below. The science teaching standard outlines the content knowledge and skills that are needed by science educators. The standard is partitioned into six areas: 1) the creation of lesson plans with inquiry based programs; 2) the steps needed in order to enhance students’ abilities to learn science; 3) the type of assessments needed to evaluate teaching and the learning of science by students; 4) guidance on how to create an environment for the learning of science; 5) assistance on building the community infrastructure to support the learning of science by its children; and 6) insight on how to develop effective science programs.

The professional development standard gives guidance regarding the type of science knowledge and skills science teachers should acquire. The professional development standard addresses four areas: 1) inquiry based learning of science; 2) the integration of science knowledge, pedagogy and students’ learning styles; 3) the ability to create a thirst for learning science within students that will last a lifetime; 4) and the creation of an integrated and coherent professional development program that will best serve the teachers’ needs (NSES, 1996).

The assessment standard identifies the criteria by which assessment practices are judged. The assessment standard looks at five areas: 1) the decisions that need to be addressed; 2) tools that evaluate achievement and the opportunity to learn science; 3) the quality of the technical data regarding the action taken by decision makers; 4) fairness for all; and finally, 5) assessments that assure the inferences that are made concerning students’ achievement and opportunity to learn science are credible (NSES, 1996).

The science content standard describes the expectation of students’ understanding of science, students’ knowledge of science content, and students’ scientific skills that enable them to perform scientific research from kindergarten to twelfth grade. The science content standard addresses eight sections which deal with the integration of learning of science concepts and science process: 1) the use of science inquiry methodology; 2) the integration of the learning of science concepts and science process; 3) the use of science inquiry methodology; 4) the inclusion of physical science and life science; 5) the inclusion of earth and space science; 6) the integration of science and technology in all grades; 7) the personalization and socialization of science; and 8) the inclusion of the history and the nature of science in the nation’s classroom (NSES, 1996).

The science education program standard gives the criterion for a quality science program. The science education program looks at six areas: 1) the consistency of all grades’ standards with the science program
standard; 2) the content standard should be developmentally appropriate, relevant to students’ lives, and engaging; 3) inquiry based and integrates other school subjects for all grades; 4) the integration of science and math programs in the nations’ classrooms; 5) the fair disbursement of science resources to all students; and 6) the creation of a community infrastructure that supports, sustains, and encourages teachers (NSES, 1996).

The science education system standard sets the criteria by which all science education programs are evaluated. The science education system considers seven sectors: 1) the alignment of policies with science content; 2) the professional development of teachers and the consistency with science program standards; 3) the synchronization of science education policies within the infrastructure that supports its agencies, institutions, and organizations; 4) the science education policies that are congruent over time compare to the availability of the resources needed to sustain science education policies; 5) the assurance of an equitable science education policy; 6) the assessment of unanticipated effects of other policies’ impact on science education; and, 7) the assessment of accountability that is required by individuals who are responsible for carrying out the science education standards (NSES, 1996).

**Content Area Teaching Standards**

1. Content: The teacher understands the central ideas, tools of inquiry, applications, structure of the science and social studies disciplines she teaches and can create learning activities that make these aspects of content meaningful to students.

2. Student Learning and Development: The teacher understands how students learn and develop and can provide learning opportunities that support students’ intellectual, social, and personal development.

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

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

5. Learning Environment: 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.

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

7. Curriculum Decisions: The teacher of plans instruction based upon knowledge of subject matter, students, the community, and curriculum goals.

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

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

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


http://www.cesso.org/projects/Interstate_New_Teacher_Assessment_and_Support_Consortium/

**Florida Educator Accomplished Practices**
1 – Assessment
2 – Communication
3 – Continuous Improvement
4 – Critical Thinking
5 – Diversity
6 – Ethics
7 – Human Development
8 – Subject Matter Knowledge
9 – Learning Environment
10 – Planning
11 – Role of the Teacher
12 - Technology

**Sunshine State Standards Strands (New Generation Sunshine State Standards coming soon)**

*Science*
SC.A – The Nature of Matter
SC.B – Energy
SC.C – Force and Motion
SC.D – Processes that Shape the Earth
SC.E – Earth and Space
SC.F – Processes of Life
SC.G – How Living Things Interact with their Environment
SC.H – Nature of Science
### Specific Behavioral Objectives

#### College of Education
Student Professional Dispositions
Spring 2011

**Candidate’s Name:** ________________________  **Student ID:** ___________  **Program Area:** _______________

<table>
<thead>
<tr>
<th>Criteria for rating</th>
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<tr>
<td>The candidate <strong>consistently and thoroughly</strong> demonstrates indicators of performance. (90–100 %)</td>
<td>The candidate <strong>usually and extensively</strong> demonstrates indicators of performance. (89-80%)</td>
<td>The candidate <strong>sometimes and adequately</strong> demonstrates indicators of performance. (79-70%)</td>
<td>The candidate <strong>rarely or never and inappropriately or superficially</strong> demonstrates indicators of performance.</td>
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#### Professionalism: The Teacher Candidate demonstrates professionalism
(Please use a ✓ to indicate level of performance.)

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<tbody>
<tr>
<td>Punctuality</td>
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<td>• Does not exceed three unexcused absences, per university catalog 2009-2010</td>
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<td>• In class at or before specified time, per Registrar</td>
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<td>• Attends class, field experiences, meetings</td>
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<tr>
<td>• Appropriate dress and grooming</td>
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<td>• Completes assignments on or before due date</td>
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<tr>
<td>• Emotional Management</td>
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<tr>
<td>o Handles feeling appropriately</td>
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<tr>
<td>o Reacts reasonably to situations</td>
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<td>o Finds a healthy balance between emotions</td>
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<td>• Demonstrates the appropriate use of personal technology during class</td>
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<td>• Follows established protocol and procedures</td>
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<tr>
<td>• Follows established procedures and policies</td>
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#### Effective Communication: The Teacher Candidate demonstrates effective communication skills
(Please use a ✓ to indicate level of performance.)

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<tr>
<td>• Uses standard English language in various settings</td>
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<td>• Uses appropriate tone of voice for the setting</td>
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(continued on next page)
- Clearly articulates concepts (avoids words such as you know, um, uh-uh, and okay)
- Models appropriate respectful communication that is not demeaning or harmful (avoids loud outbursts and profanity)
- Avoids confrontational behavior

### Criteria for rating

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<td>Respectful Behavior: The Teacher Candidate demonstrates respectful behavior</td>
<td>The candidate consistently and thoroughly demonstrates indicators of performance. (90–100 %)</td>
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- Considers opinions of others with an open mind (respects diversity)
- Listens to others in a variety of settings
- Provides equitable learning opportunities for all
- Considers background interests and attitudes
- Reacts reasonably to situations (avoids verbal confrontational behavior)

### Criteria for rating

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<td>Ethical Behavior: The Teacher Candidate demonstrates ethical behavior</td>
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- Demonstrates academic honesty
  - Avoids plagiarizing
- Demonstrate honesty inside and outside of the classroom
- Demonstrates trustworthiness
- Understands the importance of professional code of ethics
- Advocates fairness

### Criteria for rating

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<td>Reflective Behavior: The Teacher Candidate demonstrates reflective behavior</td>
<td>The candidate consistently and thoroughly demonstrates indicators of performance. (90–100 %)</td>
<td>The candidate usually and extensively demonstrates indicators of performance. (89-80%)</td>
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National, State, and PEU Standards Addressed in the Course

Interstate New Teacher Assessment and Support Consortium (INTASC) Standards

Professional Organization/Learned Society Standards

Florida Educator Accomplished Practices (FEAPs)

Florida Teacher Certification Examination (FTCE) Subject Area Examination (SAE) Competencies and Skills

Topical Outline

Physical Science High Level Overview

1. Matter
2. Changes in Matter
3. Energy
4. Heat, Electricity & Magnetism
5. Light & Sound

Chemical Science High Level Overview

1. Matter
2. Changes in Matter
3. Elements
4. Periodic Table
5. Atoms & Subatomic particles
6. Mixtures, Solutions, & Compounds
7. Molecules

Biological Science High Level Overview

1. Characteristic of Living Things
2. Organisms’ Basic Needs
3. Getting and Using of Energy
4. Cells, Tissues, Organs and Systems
4. Adaptation
4. Reproduction (Plants & Animals)
5. Vertebrates & Invertebrates

Earth and Space Science High Level Overview

Earth’s Structure

Materials in the Lithosphere
1. Rock cycle
2. Igneous rocks
3. Sedimentary rocks
4. Metamorphic rocks
Earth’s Changing Surface

Earth’s Internal Processes
1. Plate Tectonics
2. Earthquakes and the earth’s interior
3. Igneous activity

Geologic Time and Earth’s History
4. Fossils and life of geologic past
5. Magnitude of geologic time and geologic time scale
6. Relative dating

Earth’s Ecology

Ecology
1. Biosphere
2. Biomes
3. Producers
4. Consumers
5. Decomposers
6. Ecological Succession

Earth’s Natural Resources and the Environment

Natural Resources and the Environment
7. Natural Resources
8. Renewable
9. Non-Renewable
10. Conserving Resources
11. Pollution

Water on Earth

Ocean Waters and the Ocean Floor
1. Composition of seawater
2. Continental margins
3. Features of the ocean basin floor
4. Mid-ocean ridges
5. Coral reefs and atolls
6. Importance of ocean currents
7. Tides and tidal power
8. Waves and erosion

Weather and Climate

The Atmosphere
1. Weather and climate
2. Composition and structure of the atmosphere
3. The ozone problem
4. Earth-Sun relationships
5. Radiation and solar energy
6. Humidity
7 Forms of precipitation  
8 Pressure and wind  
9 Air masses and fronts  
10 Thunderstorms, tornadoes and hurricanes

Earth and It’s Moon

The Earth’s Place in the Universe  
1. The Solar System  
2. Sun  
3. Planets  
4. Moons

The Solar System and Beyond

Beyond the Solar System  
12. Properties of a star  
13. The Milky Way  
14. Galaxies  
15. Red shifts  
16. The Big Bang

A. Nature of Science

B. Sunshine State Standards and the National Science Education Standards  
5. Background and Rationale  
6. Goals for Curriculum and Interdisciplinary Unit Development  
7. Instructional Strategies and Authentic Assessment  
8. Florida Comprehensive Assessment Test

C. Science investigations geared toward  
5. experiencing thought process development in science;  
6. defining intellectual process skills developed through science;  
7. knowing what science is, how scientific knowledge develops and undergoes change and how it affects the individual and society; and  
8. meeting the needs of all children including those that are gifted, those that are physically handicapped, and those with varying exceptionalities such as those that are culturally, economically, socially and linguistically different (ESOL)

D. Research studies on:  
5. cognitive development of children;  
6. cooperative learning and curriculum integration;  
7. studies that promote conceptual learning, i.e., concept mapping, questioning techniques, brain-based teaching and learning, authentic assessment, thematic learning, providing for learning style differences and multiple intelligences with special emphasis on culturally and linguistically diverse students (ESOL); and  
8. how misconceptions are acquired by students.

E. Strategies for promoting curiosity and interest in, and understanding of science such as the utilization of  
8. hands-on experiences;  
9. classroom demonstrations;  
10. discrepant events;  
11. strategies to promote conceptual learning, i.e., concept mapping, questioning strategies, teaching to learning styles and intelligences;  
12. cooperative learning;
thematic learning; and
14. science projects, field trips and science fairs.

F. Designing, implementing and evaluating science activities in the classroom:
   5. selecting and designing developmentally appropriate activities and activities that meet the needs of all
      students with emphasis on culturally and linguistically diverse students (ESOL);
   6. planning strategies to promote curiosity, interest, student involvement, and higher order thinking skills;
   7. rubrics development for assessment with special emphasis on culturally and linguistically diverse students
      (ESOL); and
   8. lesson plan development

G. Designing an integrated curriculum unit around a unifying theme consisting of:
   c. an Overall Integrated Unit Planning Guide including:
      6. Essential Questions
      7. Instructional Activities outline
      8. Resources
      9. Culminating Products, Projects, Exhibitions
      10. Rubrics for Assessment
   d. Subject Area Tool Guides for Science, Mathematics, Language Arts and Social Studies including:
      6. Sunshine State Benchmark Codes
      7. Thinking Skills and Habits of Mind
      8. Purpose
      9. Content Activities
      10. Instructional Strategies

7. Computer applications in the science classroom
   4. Interactive Video, CD-ROM
   5. Interfacing Devices for Data Collection and Interpretation
   6. Email and Internet

8. Safety in the laboratory and classroom
   3. Caring for Plants and Animals in the Classroom
   4. Safety Precautions with Chemicals and Equipment

9. Classroom management and Discipline

**Teaching Methods**

Methods used in this course include, lecture, class discussion, videos, multi-media presentations, internet searches, observation in classrooms with English language learners, cooperative learning groups, student presentations, and modeling of strategies.

Class sessions are designed around participation in hands-on activities, field-based inquiry, small and large-group discussions and practical experiences working with elementary grade students that allow us to explore the meaning of doing, thinking and talking about inquiry in context. With these tasks in mind, the course has been organized so as to “spiral” through the three main topics of curriculum, instruction and assessment several times, each time considering another aspect of the topic. You will be successful in this course to the degree that you become an active and engaged participant in our attempts to construct a shared vision of what good science teaching looks like in practice.

Problem-centered hands-on experiences, class discussions of research and best practices, demonstrations, cooperative learning, active participation in designing experiments and performing experiments, critiquing...
Science lessons, modeling, portfolio assessment, micro-teaching demonstrating and questioning strategies that facilitate development of critical thinking, microteaching and field/clinical experiences. Throughout the course ESOL strategies will be integrated to awareness of needs of second language learners.

Course Evaluation

Note - All written assignments should be word-processed and turned in on the due date indicated in this syllabus. If you foresee a problem meeting a due date, you must speak with me ahead of time. Late assignments will not be accepted if prior arrangements have not been made. Electronic submission of assignments to Safe Assignment will be required.

Evaluation/Assessment Tools

There are many tools that can be used such as questioning, probing, convergent questions, divergent questions, extending questions, extending and lifting questions, funneling questions, sowing and reaping questions, step by step up questions, step by step down questions, nose-dive questions, quick quiz, lab work, activity rubric, self assessment checklist, papers, presentations, journals tests and final exams.

Class Participation

You are required to submit a bio with a picture. Your bio should feature a synopsis of your past, where you are presently, and your future. **Due 01/06/11**

Assignment #1: Science Trade Book Analysis (10 points) **Due in class on 02/10/11**

What is science and how are we portraying it to our students? Most science trade books present science as a collection of facts and concepts. The scientists and the work they did to arrive at those facts and discoveries are largely omitted. A small number of science trade books exist that paint a richer picture of the process of scientific discovery. For this assignment you will read one of these books (a list of suggested books will be provided) and write a short (2-3 page) book review. The focus of the review should be on how science is being presented in this book. What ideas about the practice of science (not what science facts!!) does the reader come away with? Be sure to answer the following questions: 1) What is science according to this book? 2) What do scientists do according to this book? 3) What do you see as the value or importance of using books of this kind in the teaching of science?

Assignment #2: Inquiry-Based (C. C. T.) Science Lesson (20 points) **Due in class on 03/03/11**

This is an individual & small group assignments (groups of 3-4) in which you will develop and peer-teach a model science lesson. There are 2 purposes for this assignment:

1) To practice designing and planning a standards-based inquiry science lesson
2) To practice teaching a hands-on inquiry-based science lesson

I am looking for you to do the following:

1) Develop a lesson based on a clear testable question
2) Develop a lesson that engages all class members in a hands-on way in a process of inquiry to try to answer the testable question (to answer a testable question their most likely needs to be some kind of data collection)
3) Reflect on and list all the Sunshine State Standards that you believe are being addressed in your lesson – especially the Science SSS but also other content areas as appropriate
4) Create a 1-2 page handout that would allow your classmates to repeat your activity in their own classrooms in the future
5) Demonstrate good organization, preparation, and instructional practices during the teaching of the lesson
6) Follow (at least loosely) the 4 features of a good inquiry-based science lesson discussed in class – hook, activity, extension/application, and assessment and consider using one of the instructional strategies we learned.

Midterm 03/03/2011 (20 points)


You will keep a journal throughout the semester that will have two distinct components. First, you will keep an Observational Nature Journal throughout the course. You will be responsible for making weekly entries of your observations of the natural surroundings from a particular location that you will select during the first week of class. Go to this spot once per week and spend at least 10-15 minutes observing and recording the sights, sounds, smells etc. that you experience in that place. Feel free to draw sketches, take pictures or document the site in any other creative way that you wish. Be especially attentive to similarities and differences that you notice over time.
Second, you will write a brief reflective entry each time you visit a classroom as part of your field experience. Please do NOT summarize everything that happened during the lesson. Instead, reflect on what you LEARNED from the experience and how this applies to your future teaching

Assignment #4: The Cell Activity (Integrating Science Experience into Lesson Plans and Instructions (10 points) Due in class on 04/19/11

You will create a lesson plan and instructions session that integrates a science experiment that will reinforce the science concept you are teaching. You will use the Concept Development and the Concept Attainment Lesson Plans as your templates. You will demonstrate how you will teach the child how to think critically as understand the concept.

All Past Due Assignments will not be accepted after 04/07/2011

All Assignments Must Be Upload On To Task Stream & Black Board 14/07/2011

Final Exam: Earth Science Final Exam Project (20 points) 04/21/2011

Professionalism, Preparation & Participation (10 points)
Professional teachers are rarely absent, always arrive on time, and turn in work that meets deadlines and is meticulously done, and are active participants in staff development and other opportunities for intellectual growth. As soon-to-be professional teachers, I expect the same behaviors in this class. Active and meaningful participation in all aspects of the course, including class discussions and activities, the field experience assignment, group work on the group teaching assignment, etc. will all factor in to this portion of your grade.
Grading

A  90-100
B  89-80
C  79-70
D  69-60
F  below 60

Course Policies

A. EXCUSED TARDINESS, ABSENCES AND MISSED DEADLINES

Tardiness or Leaving Early

You are expected to attend every class. You will sign an attendance log every day. You will sign a tardy log whenever you are tardy or leave early. After 3 absences, your overall grade will decrease by a letter grade. If, you are tardy or if you leave class early, your overall grade will decrease by 1%. In the event Dr. Davis is late, you are expected to wait at least 20 minutes for her.

I can understand that, for many people, life happens. If you have a solid, valid reason for missing class, I am willing to excuse your absence with the Dean’s approval. If you know that you will be absent from class, please let me beforehand so that we can make sure that you get the class work. If you cannot warn me of an absence, please inform me – by e-mail or by phone – as soon as you can about why you have missed a class. What I do not know about, I cannot take into consideration. It is your responsibility to get material and assignments from any class missed. I urge you to e-mail me for questions/concerns. It is practically impossible to pass this course with poor attendance.

Only valid medical excuses – a signed doctor’s letter or hospital ER discharge – will be accepted for missing a test or for turning in an assignment late. Missed tests, without a valid medical excuse, will be graded as F. Late assignments, without a valid medical excuse, will be immediately dropped a full letter for each class meeting that goes by without its being turned in; hence, as soon as class ends on the day a paper was due, the highest grade possible drops from A to B; if it is not turned in by the end of the next class, the highest grade possible drops from B to C; and so forth.

B. SAFE LEARNING ENVIRONMENT

Many people come to science – especially new topics in science—with concerns about how they will look to their friends and colleagues. My goal in this class is for people to have the safety to try out ideas, to talk about how they are thinking about the science tasks that they are trying, to argue for why their thinking is correct, and to have the pros/cons of those arguments weighed in a public forum. It is my intent to provide all course participants with a safe and secure learning environment that is essential for a course like this to succeed.

Some people are put off or threatened within a setting that also promotes such a free give and take of ideas, experiences, and knowledge. This is especially true when one’s own “knowledge” of science (where there is thought to be absolutely right or wrong answers) are subjected to scrutiny by others and/or when one is asked to produce the warrants or basis for particular claims. I would encourage class participants to check with me if things become too threatening to either their beliefs or identities so that we can discuss ways by which to lessen these feelings.
The line between passionate discussion of ideas and personal attacks gets crossed when such discussions and scrutiny become so relentless that are transformed or when debate becomes ad hominem. I try to keep an eye out for such dynamics in all my classes.

C. Academic Ethics

All students are expected to abide by the FAMU’s honor code which “was established to preserve the academic integrity of the student body, to encourage consistent ethical behavior among undergraduates, and to foster a climate of fair competition.” All students at FAMU are expected to understand and uphold the honor code. Cheating will not be tolerated.

D. Accommodation of Disabilities

All reasonable accommodation will be made for students with disabilities. Anyone who requires ADA accommodations for unique learning styles should contact Disability Services in the Academic Development Center and should seek proper approvals from within the University. Anyone who has some unique medical needs or for whom medical intervention is required (say someone suffers a broken bone while doing something) which interferes with class participation or requires that I modify this course’s academic requirements should obtain a physician’s note that could serve as a medically-excused absence. The basis for a student’s ADA accommodation or medical excuse should be accommodated. If you have any questions, feel free to ask me.

E. TEXTS:

Required texts

Sciensesaurus K-8 grades
Great Source Education Group, a division of Houghton Mifflin Company

Foundations of Earth Science - 5th Edition
Book Author: Lutgens and Tarbuck

F. Task Stream POLICY:

Note:
All students enrolled in a teacher education program will be required to purchase Task Stream and use it throughout their course sequence.

The following assignment will serve as Task Stream artifacts for your portfolio:

Assignment 2: Inquiry-based Science Lesson - addresses the following Florida Educator Accomplished Practices (FEAPs): #2 Communication; #4 Critical Thinking; and #8 Knowledge of Subject Matter

I have created a template in Live Text that you can use to enter the three artifacts.

G. DATE OF COURSE OUTLINE DEVELOPMENT/REVISION: Spring 2011
H. Classes are Technology Free Zones with the exception of when the Instructor introduces the Technology.

In other words you (the student) will not have headphones, cell phones (no text messaging), iPods, laptops, or other electronic devices during class. Students should not be involved in anything that could distract them from acquiring the necessary knowledge or life skills that will help make them successful.

All students will sign a contract agreeing to these conditions on the first day of class. If a student misses the first day of class the student will sign the contract on the first day they attend class.

### Tentative Course Calendar

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic and Activities</th>
<th>Conceptual Framework (CF), INTASC (I) &amp; FEAP (F) SSS (SC)</th>
<th>Assignments &amp; Readings</th>
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</thead>
<tbody>
<tr>
<td>Week 1: 01/04/11</td>
<td>Science Earth Science Earth and Space Science High Level Overview The Theoretical Perspectives of Education (How students learn and How teachers teach)</td>
<td>CF: 1,2,3,4,5 FEAP: 2,4,5,6,7,8,9,11,12 I: 1,2,3,4,5,6,7,8,9,10 SC:E</td>
<td>An in class assignment write me a profile about yourself...where you have been, where you are now, and where you are going. Also submit digital photo... (Upload on Blackboard).</td>
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</table>

**Physical & Chemical Science Sciencesaurus**
Red Book pg 234-305  Your synopsis of your reading is **Due 01/13/11**
Blue book pg 240-317  Your synopsis of your reading is **Due 01/13/11**
Green Book pg 249-321  Your synopsis of your reading is **Due 01/13/11**

**Reading: Sciencesaurus**
Red Book pg 2-77  Your synopsis of your reading is **Due**
Week 1:
01/06/11
Science Earth Science
Earth and Space Science High Level Overview
The Theoretical Perspectives of Education (How students learn and How teachers teach)
CF: 1,2,3,4,5
FEAP: 2,4,5,6,7,8,9,11.12
I: 1,2,3,4,5,6,7,8,9,10
SC:E,H
Reading: Sciencesaurs
Red Book pg 2-77
Your synopsis of your reading is Due 01/20/11
Blue book pg 2-73
Your synopsis of your reading is Due 01/20/11
Green Book pg 001-072
Your synopsis of your reading is Due 01/20/11

Week 2:
01/13/11
Science Earth Science
Earth and Space Science High Level Overview
The Theoretical Perspectives of Education (How students learn and How teachers teach)
CF: 1,2,3,4,5
FEAP: 2,4,5,6,7,8,9,11.12
I: 1,2,3,4,5,6,7,8,9,10
SC:E,H
Reading: Sciencesaurs
Red Book pg 2-77
Your synopsis of your reading is Due 01/27/11
Blue book pg 2-73
Your synopsis of your reading is Due 01/27/11
Green Book pg 001-072
Your synopsis of your reading is Due 01/27/11
| Week 3: 01/18/11 | Science Earth Science  
Earth and Space Science High Level Overview  
Earth’s Structure  
The Theoretical Perspectives of Education (How students learn and How teachers teach)  
Models, Strategies, Methods, and Skills | CF: 1,2,3,4,5  
FEAP: 2,4,5,6,7,8,9,11.12  
I: 1,2,3,4,5,6,7,8,9,10  
SC:E,H | Reading:  
*Sciencesaurus*  
Red Book pg 156-159 Your synopsis of your reading is **Due 02/03/11**  
Blue book pg 156-159 Your synopsis of your reading is **Due 02/03/11**  
Green Book pg 175-177 Your synopsis of your reading is **Due 02/03/11**  
Foundations of Earth Science Pg. 1-15 Your synopsis of your reading is **Due 02/03/11**  
**Assignment #1:** |
| Week 3: 01/20/11 | Science Earth Science  
Earth and Space Science High Level Overview  
Earth’s Structure  
The Theoretical Perspectives of Education (How students learn and How teachers teach)  
Models, Strategies, Methods, and Skills | CF: 1,2,3,4,5  
FEAP: 2,4,5,6,7,8,9,11.12  
I: 1,2,3,4,5,6,7,8,9,10  
SC:E,H | Reading:  
*Sciencesaurus*  
Red Book pg 156-159 Your synopsis of your reading is **Due 02/10/11**  
Blue book pg 156-159 Your synopsis of your reading is **Due 02/10/11**  
Green Book pg 175-177 Your synopsis of your reading is **Due 02/10/11**  
Foundations of Earth Science Pg. 1-15 Your synopsis of your reading is **Due 02/10/11**  
**Assignment #1:** |
| Week 4: 01/25/11 | Earth and Space Science High Level Overview  
Earth’s Structure  
Earth’s Changing Surface  
The Theoretical Perspectives of Education (How students learn and How teachers teach)  
Models, Strategies, Methods, and Skills  
Lesson Plans That Develops Critical Thinking | CF: 1,2,3,4,5  
FEAP: 2,4,5,6,7,8,9,11.12  
I: 1,2,3,4,5,6,7,8,9,10  
SC:D,E,H | Reading:  
Sciencesaurs  
Red Book pg 166-175 Your synopsis of your reading is Due 02/17/11  
Blue book pg 170-186; Your synopsis of your reading is Due 02/17/11  
Green Book pg 181-193 Your synopsis of your reading is Due 02/17/11  
Foundations of Earth Science Pg. 37-63; Your synopsis of your reading is Due 02/17/11 |
|---|---|---|---|
| Week 4: 01/27/11 | Earth and Space Science High Level Overview  
Earth’s Structure  
Earth’s Changing Surface  
The Theoretical Perspectives of Education (How students learn and How teachers teach)  
Models, Strategies, Methods, and Skills  
Lesson Plans That Develops Critical Thinking | CF: 1,2,3,4,5  
FEAP: 2,4,5,6,7,8,9,11.12  
I: 1,2,3,4,5,6,7,8,9,10  
SC:D,E,H | Reading:  
Sciencesaurs  
Red Book pg 166-175 Your synopsis of your reading is Due 02/24/11  
Blue book pg 170-186; Your synopsis of your reading is Due 02/24/11  
Green Book pg 181-193 Your synopsis of your reading is Due 02/24/11  
Foundations of Earth Science Pg. 37-63; Your synopsis of your reading is Due 02/24/11 |
| Week 5 02/01/11 | Earth and Space Science High Level Overview  
Earth’s Structure  
Earth’s Changing Surface  
The Theoretical Perspectives of Education (How students learn and How teachers teach)  
Models, Strategies, Methods, and Skills  
Lesson Plans That Develops Critical Thinking | CF: 1,2,3,4,5  
FEAP: 2,4,5,6,7,8,9,11.12  
I: 1,2,3,4,5,6,7,8,9,10  
SC:D,E,H | Reading: 
*Sciencesaurus*  
Red Book pg 128-155  
Your synopsis of your reading is **Due 03/01/11**  
Blue book pg 126-138  
Your synopsis of your reading is **Due 03/01/11**  
Green Book pg 129-149  
Your synopsis of your reading is **Due 03/01/11**  
*Foundations of Earth Science*  
Pg. 65-99  
Your synopsis of your reading is **Due 03/01/11** |
|---|---|---|---|
| Week 5: 02/03/11 | Science Earth Science  
Earth and Space Science High Level Overview  
Earth’s Structure  
Earth’s Changing Surface  
The Theoretical Perspectives of Education (How students learn and How teachers teach)  
Models, Strategies, Methods, and Skills  
Lesson Plans That Develops Critical Thinking | CF: 1,2,3,4,5  
FEAP: 2,4,5,6,7,8,9,11.12  
I: 1,2,3,4,5,6,7,8,9,10  
SC:D,E,H | Reading: 
*Sciencesaurus*  
Red Book pg 128-155  
Your synopsis of your reading is **Due 03/01/11**  
Blue book pg 126-138  
Your synopsis of your reading is **Due 03/01/11**  
Green Book pg 129-149  
Your synopsis of your reading is **Due 03/01/11**  
*Foundations of Earth Science*  
Pg. 65-99  
Your synopsis of your reading is **Due 03/01/11**  
Assignment #2: Inquiry-Based (C.C.T.) Science Lesson (20 points) |
<p>| Week 6: 02/08/11 | Science Earth Science Earth and Space Science High Level Overview Earth’s Structure Earth’s Changing Surface Earth’s Ecology The Theoretical Perspectives of Education (How students learn and How teachers teach) Models, Strategies, Methods, and Skills Lesson Plans That Develops Critical Thinking | CF: 1,2,3,4,5, FEAP: 2,4,5,6,7,8,9,11.12 I: 1,2,3,4,5,6,7,8,9,10 SC:D,E,F,G,H | Life Science Sciencesaurs Red Book pg 78-155 Your synopsis of your reading is Due 09/30/10 Blue book pg 74-155 Your synopsis of your reading is Due 09/30/10 Green Book pg 073-164 Your synopsis of your reading is Due 09/30/10 Reading: Sciencesaurs Red Book pg 306-155-341 Your synopsis of your reading is Due 03/10/11 Blue book pg 318-353 Your synopsis of your reading is Due 03/10/11 Green Book pg 323-353 Your synopsis of your reading is Due 03/10/11 Foundations of Earth Science Pg. 101-112 Your synopsis of your reading is Due 03/10/11 |
| Week 6: 02/10/11 | Science Earth Science Earth and Space Science High Level Overview Earth’s Structure Earth’s Changing Surface | CF: 1,2,3,4,5, FEAP: 2,4,5,6,7,8,9,11.12 I: 1,2,3,4,5,6,7,8,9,10 | Reading: Sciencesaurs Red Book pg 306-155-341 Your synopsis of your reading is Due 03/10/11 |</p>
<table>
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<tr>
<th>Week 7: 02/15/11</th>
<th>Earth’s Ecology Lesson Plans That Develops Critical Thinking</th>
<th>SC:D,E,F,G,H, reading is Due 03/15/11 Blue book pg 318-353 Your synopsis of your reading is Due 03/15/11 Green Book pg 323-353 Your synopsis of your reading is Due 03/15/11 Foundations of Earth Science Pg. 101-112 Your synopsis of your reading is Due 03/15/11</th>
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<tbody>
<tr>
<td>Week 7: 02/17/11</td>
<td>Science Earth Science Earth and Space Science High Level Overview Earth’s Structure Earth’s Changing Surface Earth’s Ecology Lesson Plans That Develops Critical Thinking</td>
<td>CF: 1,2,3,4,5, FEAP: 2,4,5,6,7,8,9,11.12 I: 1,2,3,4,5,6,7,8,9,10 SC:D,E,F,G,H, Reading: Sciencesaurs Red Book pg 160-165 Your synopsis of your reading is Due 03/17/11 Blue book pg 187-197 Your synopsis of your reading is Due 03/17/11 Green Book pg 201-211 Your synopsis of your reading is Due 03/17/11 Foundations of Earth Science Pg. 113-127 Your synopsis of your reading is Due 03/17/11</td>
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<td>Week 8: 02/22/11</td>
<td>Science Earth Science Earth and Space Science High Level Overview  Earth’s Structure  Earth’s Changing Surface  Earth’s Ecology  Earth’s Natural Resources and the Environment  Lesson Plans That Develops Critical Thinking  Teaching Science Equitably to All Children</td>
<td>CF: 1,2,3,4,5,6  FEAP: 2,4,5,6,7,8,9,11.12  I: 1,2,3,4,5,6,7,8,9,10  SC:D,E,F,G,H</td>
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<td>Week 8: 02/24/11</td>
<td>Science Environmental Science  Earth and Space Science High Level Overview  Earth’s Structure  Earth’s Changing Surface  Earth’s Ecology  Earth’s Natural Resources and the Environment  Lesson Plans That Develops Critical Thinking</td>
<td>CF: 1,2,3,4,5,6  FEAP: 2,4,5,6,7,8,9,11.12  I: 1,2,3,4,5,6,7,8,9,10  SC:E,H</td>
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| Week 9: 03/01/11 | Science Earth Science Earth and Space Science High Level Overview  
Earth’s Structure  
Earth’s Changing Surface  
Earth’s Ecology  
Earth’s Natural Resources and the Environment  
Lesson Plans That Develops Critical Thinking  
Teaching Science Equitably to All Children | CF: 1,2,3,4,5,6  
FEAP: 2,4,5,6,7,8,9,11,12  
I: 1,2,3,4,5,6,7,8,9,10  
SC:D,E,F,G,H | Read Appendix on History of Science In Red, Blue and Green Books  
Review Earth and Space Science Readings  
Review Lab Safety Readings  
Review the Scientific Methods  
Synopsis due 04/07/11 |
| --- | --- | --- | --- |
| Week 9: 03/03/11 Midterm | Science Earth Science Earth and Space Science High Level Overview  
Earth’s Structure  
Earth’s Changing Surface  
Earth’s Ecology  
Earth’s Natural Resources and the Environment  
Lesson Plans That Develops Critical Thinking  
Teaching Science Equitably to All Children | Read Appendix on History of Science In Red, Blue and Green Books  
Review Earth and Space Science Readings  
Review Lab Safety Readings  
Review the Scientific Methods  
Synopsis due 04/14/11 |
<p>| Week 10: 03/08/11 Spring Break | Science Earth Science Earth and Space Science High Level Overview Earth’s Structure Earth’s Changing Surface Earth’s Ecology Earth’s Natural Resources and the Environment Lesson Plans That Develops Critical Thinking Teaching Science Equitably to All Children | CF: 1,2,3,4,5,6 FEAP: 2,4,5,6,7,8,9,11.12 I: 1,2,3,4,5,6,7,8,9,10 SC:D,E,F,G,H | Read the Glossary of Red Blue and Green Books Review Changing Surface Review Lab Safety Readings Review the Scientific Methods Synopsis due 04/21/11 |
| Week 10: 03/10/11 Spring Break | Science Environmental Science Earth and Space Science High Level Overview Earth’s Structure Earth’s Changing Surface Earth’s Ecology Earth’s Natural Resources and the Environment Water on Earth Lesson Plans That Develops Critical Thinking Teaching Science Equitably to All Children Building Assessment into Instruction | CF: 1,2,3,4,5,6 FEAP: 2,4,5,6,7,8,9,11.12 I: 1,2,3,4,5,6,7,8,9,10 SC:E,H | Read the Technology of Red Blue and Green Books Review Ecology Sections Review Lab Safety Readings Review the Scientific Methods Synopsis due 04/21/11 |
| Week 11: 03/15/11 | Science Environmental Science Earth and Space Science High Level Overview Earth’s Structure Earth’s Changing Surface Earth’s Ecology Earth’s Natural Resources and the Environment Water on Earth Lesson Plans That Develops Critical Thinking Teaching Science Equitably to All Children | CF: 1,2,3,4,5,6 FEAP: 2,4,5,6,7,8,9,11.12 I: 1,2,3,4,5,6,7,8,9,10 SC:E,H | Find a Science Education Journal and Read Review Natural Resources and Environment Sections Review Lab Safety Readings Review the Scientific Methods |</p>
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<tr>
<th>Week</th>
<th>Date</th>
<th>Subject</th>
<th>Topics</th>
<th>Assignment Due</th>
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<tr>
<td>Week 11: 03/17/11</td>
<td>Science Environmental Science</td>
<td>Earth and Space Science High Level Overview</td>
<td>Earth’s Structure, Earth’s Changing Surface, Earth’s Ecology, Earth’s Natural Resources and the Environment, Water on Earth, Weather and Climate, Earth and It’s Moon</td>
<td>Review Water Sections, Review Lab Safety Readings, Review the Scientific Methods, Synopsis due 04/21/11</td>
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<tr>
<td>Week 11: 03/22/11</td>
<td>Science Environmental Science</td>
<td>Earth and Space Science High Level Overview</td>
<td>Earth’s Structure, Earth’s Changing Surface, Earth’s Ecology, Earth’s Natural Resources and the Environment, Water on Earth, Weather and Climate, Earth and It’s Moon</td>
<td>Review Weather &amp; Climate Sections, Review Lab Safety Readings, Review the Scientific Methods, Synopsis due 04/21/11</td>
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<td>Week 12: 03/24/11</td>
<td>Science Environmental Science</td>
<td>Earth and Space Science High Level Overview</td>
<td>Earth’s Structure</td>
<td>Review Earth &amp; Moons Sections, Review Lab Safety Readings</td>
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<td>Week 13: 03/29/11</td>
<td>Science Environmental Science</td>
<td>SC:E,H</td>
<td>Readings</td>
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<td>Earth and Space Science High Level Overview</td>
<td>Review the Scientific Methods Synopsis due 04/21/11</td>
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<td>Earth’s Structure</td>
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<td>The Solar System and Beyond</td>
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<td>Lesson Plans That Develops Critical Thinking</td>
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<td>Teaching Science Equitably to All Children</td>
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<td>The Cell Exercise K-8</td>
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<tr>
<th>Week 13: 03/31/11</th>
<th>Science Environmental Science</th>
<th>SC:E,H</th>
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<tr>
<td>Earth and Space Science High Level Overview</td>
<td>Review the Scientific Methods Synopsis due 04/21/11</td>
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<td>Earth’s Structure</td>
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<td>Week 14: 04/05/11</td>
<td>Science Environmental Science</td>
<td>CF: 1,2,3,4,5,6</td>
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<td>Earth and Space Science High Level Overview</td>
<td>FEAP: 2,4,5,6,7,8,9,11.12</td>
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<td>Review Space Sections</td>
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<td>Review Lab Safety Readings</td>
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<td>Review the Scientific Methods</td>
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<td>Synopsis due 04/28/11</td>
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<td>Assignment #3 Field Journals Due every Thursday beginning January 20, 2011</td>
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<td>Assignment #4 Cell Activity Due 04/19/11</td>
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<tr>
<th>Week 14: 04/07/11</th>
<th>Catch Up Day</th>
<th>Last Day To Turn In Past Due Assignments</th>
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<th>Catch Up Day</th>
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<tr>
<th>Week 15: 04/14/11</th>
<th>Field Trip: Learning Tree</th>
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<th>Week 16: 04/19/11</th>
<th>Review for Final Project</th>
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<th>Week 16: 04/21/11</th>
<th>Final Exam (Final Project Due)</th>
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Orientation
What is Science?
Sunshine State Standards
Experiments/Hands-on Activities/Discussions
Questioning Strategies
Promoting Higher Order Thinking Skills

Nature of Science
Experiments/Hands-on Activities/Discussions
Questioning Strategies
Planning, Setting Up and Managing Your Classroom for Teaching Science
Cooperative Learning
Providing for Students with Varying Exceptionalities
Experiments/Hands-on Activities/Discussions
Writing a Science Investigation Report
Cognitive Development Theory
Cognitive Psychology and Science Learning
Varying Exceptionalities of Children
Developing Higher Order Thinking Skills
  (Turn in grade level for integrated units plans)
Concept Mapping
Integrating the Curriculum
Assessing Science Learning

Concept Mapping
Brain Research
Styles of Learning

Midterm Examination
Lesson Plan Development

Project Learning Tree Workshop (Required)
Thursday, October 7, 2010 9:30 am – 3:30 pm
Selection of mini-teaching activity
Critique of Teaching Strategies

Concept Development & Concept Attainment
Lesson Plan is due
Critique of teaching strategies

Mini-Teaching
Concept Development

Mini-Teaching
Concept Attainment

This course has a concurrent field experience component of 20 total hours for each student. This semester, there will two options for completing the field experience. Option A involves spending 20 hours in one or more classrooms here at FAMU DRS during science instructional time. Option B involves spending 10 hours in one or more classrooms here at FAMU DRS during science instructional time and spending one full day participating in a professional development workshop given by Dr. Davis. More information on the logistics of both options will be discussed in class. The field experience is an important component of the course, as it is your opportunity to integrate, assimilate and apply what you are learning to actual teaching situations.

Supplementary Materials and References


Florida Department of Education. *Science For All Students, the Florida PreK-12 Science Curriculum Framework*. Tallahassee, Florida 1993.


**NCATE STANDARDS FOR SCIENCE**

1. **CONTENT**
   The program prepares candidates to structure and interpret the concepts, ideas and relationships in science that are needed to advance student learning in the area of licensure as defined by state and national standards developed by the science education community. Content refers to:
   - Concepts and principles understood through science.
   - Concepts and relationships unifying science domains.
   - Processes of investigation in a science discipline.
   - Applications of mathematics in science research.

2. **NATURE OF SCIENCE**
   The program prepares teachers to engage students in activities to define the values, beliefs and assumptions inherent to the creation of scientific knowledge within the scientific community, and contrast science to other ways of knowing. Nature of science refers to:
   - Characteristics distinguishing science from other ways of knowing.
   - Characteristics distinguishing basic science, applied science and technology.
   - Processes and conventions of science as a professional activity.
   - Standards defining acceptable evidence and scientific explanation.

3. **INQUIRY**
   The program prepares candidates to engage students regularly and effectively in science inquiry and facilitate understanding of the role of inquiry plays in the development of scientific knowledge. Inquiry refers to:
   - Questioning and formulating solvable problems.
   - Reflecting on, and constructing, knowledge from data.
   - Collaborating and exchanging information while seeking solutions.
   - Developing concepts and relationships from empirical experience.

4. **CONTEXT OF SCIENCE**
   The program prepares candidates to relate science to the daily lives and interests of students and to a larger framework of human endeavor and understanding. The context of science refers to:
   - Relationships among systems of human endeavor including science and technology.
- Relationships among scientific, technological, personal, social and cultural values.
- Relevance and importance of science to the personal lives of students.

5. **SKILLS OF TEACHING**
   The program prepares candidates to create a community of diverse student learners who can construct meaning from science experiences and possess a disposition for further inquiry and learning.

   Pedagogy refers to:

   - Science teaching actions, strategies and methodologies.
   - Interactions with students that promote learning and achievement.
   - Effective organization of classroom experiences.
   - Use of advanced technology to extend and enhance learning.
   - Use of prior conceptions and student interests to promote new learning.

6. **CURRICULUM**
   The program prepares candidates to develop and apply a coherent, focused science curriculum that is consistent with state and national standards for science education and appropriate for addressing the needs, abilities and interests of students. Science curriculum refers to:

   - An extended framework of goals, plans, materials, and resources for instruction.
   - The instructional context, both in and out of school, within which pedagogy is embedded.

7. **SOCIAL CONTEXT**
   The program prepares candidates to relate science to the community and to use human and institutional resources in the community to advance the education of their students in science. The social context of science teaching refers to:

   - Social and community support network within which occur science teaching and learning.
   - Relationship of science teaching and learning to the needs and values of the community.
   - Involvement of people and institutions from the community in the teaching of science.

8. **ASSESSMENT**
   The program prepares candidates to use a variety of contemporary assessment strategies to evaluate the intellectual, social, and personal development of the learner in all aspects of science. Assessment refers to:

   - Alignment of goals, instruction and outcomes.
   - Measurement and evaluation of student learning in a variety of dimensions.
   - Use of outcome data to guide and change instruction.

9. **ENVIRONMENT FOR LEARNING**
   The program prepares candidates to design and manage safe and supportive learning environments reflecting high expectations for the success of all students. Learning environments refers to:

   - Physical spaces within which learning of science occurs.
   - Psychological and social environment of the student engaged in learning science.
• Treatment and ethical use of living organisms.
• Safety in all areas related to science instruction.

10. PROFESSIONAL PRACTICE

The program prepares candidates to participate in the professional community, improving practice through their personal actions, education and development. Professional practice refers to:

• Knowledge of, and participating in, the activities of the professional community.
• Ethical behavior consistent with the best interests of students and the community.
• Reflection on professional practices and continuous efforts to ensure the highest quality of science instruction.
• Willingness to work with students and new colleagues as they enter the profession.

FLORIDA EDUCATOR ACCOMPLISHED PRACTICES/PREPROFESSIONAL

FEAP#1. The preprofessional teacher collects and uses data gathered from a variety of sources. These sources include both traditional and alternate assessment strategies. Furthermore, the teacher can identify and match the students’ instructional plans with their cognitive, social, linguistic, cultural, emotional, and physical needs.

FEAP#2. The preprofessional teacher recognizes the need for effective communication in the classroom and is in the process of acquiring techniques which she/he will use in the classroom.

FEAP#3. The preprofessional teacher realizes that she/he is in the initial stages of a lifelong learning process and that self reflection is one of the key components of that process. While her/his concentration is, of necessity, inward and personal, the role of colleagues and school-based improvement activities increases as time passes. The teacher’s continued professional improvement is characterized by self-reflection, working with immediate colleagues and teammates, and meeting the goals of a personal professional development plan.

FEAP#4. The preprofessional teacher is acquiring performance assessment techniques and strategies that measure higher order thinking skills in students and is building a repertoire of realistic projects and problem-solving activities designed to assist all students in demonstrating their ability to think creatively.

FEAP#5. The preprofessional teacher establishes a comfortable environment which accepts and fosters diversity. The teacher must demonstrate knowledge and awareness of varied cultures and linguistic backgrounds. The teacher creates a climate of openness, inquiry, and support by practicing strategies such as acceptance, tolerance, resolution, and mediation.


FEAP#7. Drawing upon well established human development/learning theories and concepts and a variety of information about students, the preprofessional teacher plans instructional activities.

FEAP#8. The preprofessional teacher has a basic understanding of the subject field and is beginning to understand that the subject is linked to other disciplines and can be applied to real-world integrated settings. The teacher’s repertoire of teaching skills includes a variety of means to assist student acquisition of new knowledge and skills using that knowledge.

FEAP#9. The preprofessional teacher understands the importance of setting up effective learning environments and has techniques and strategies to use to do so including some that provide opportunities for student input into the processes. The teacher understands that she/he will need a variety of techniques and work to increase his/her knowledge and skills.

FEAP#10. Recognizing the importance of setting high expectations for all students, the preprofessional teacher works with other professionals to design learning experiences that meet students’ needs and interests. The teacher
candidate continually seeks advice/information from appropriate resources (include feedback), interprets the information, and modifies her/his plans appropriately. Planned instruction incorporates a creative environment and utilizes varied and motivational strategies and multiple resources for providing comprehensible instruction for all students. Upon reflection, the teacher continuously refines outcome assessment and learning experiences.

FEAP#11. The preprofessional teacher communicates and works cooperatively and works cooperatively with families and colleagues to improve the educational experiences at the school.

FEAP#12. The preprofessional teacher uses technology as available at the school site and as appropriate to the learner. She/he provides students with opportunities to actively use technology and facilitates access to the use of electronic resources. The teacher also uses technology to manage, evaluate, and improve instruction.

**ESOL PERFORMANCE STANDARDS**

**ESOL 1.** Conduct ESOL programs within the parameters, goals, and stipulations of the Florida Consent Decree.

**ESOL 8.** Select and develop appropriate ESOL content according to student levels of proficiency to listening, speaking, reading and writing, taking into account: Basic and Cognitive language proficiency skills (CALPS) as they apply to the ESOL curriculum.

**ESOL 15.** Evaluate, select, and employ appropriate instructional materials, media, and technology for ESOL at the elementary level.

**ESOL 17.** Evaluate, adapt, and employ appropriate instructional materials, media, and technology for ESOL in the content areas at elementary, middle, and high school.

**ESOL 22.** Develop and implement strategies for using school, neighborhood, and home resources in the ESOL curriculum.

**ESOL 24.** Develop, implement, and evaluate instructional programs in ESOL, based on current trends in research and practice.