

LAST REVIEW: 2008-09 NEXT REVIEW: 2013-14 STATUS: A

COURSE TITLE: Integrative Teaching Methods in Middle Grades Science

COMMON COURSE NUMBER: SCE 3320

CREDIT HOURS: 3

CONTACT HOUR BREAKDOWN

CLOCK HOURS:

Lecture: **32** Lab: **20**

Clinic: Other:

PREREQUISITE(S): SCE 3943 (Completion of at least 75% of the required science content courses for Middle Grades General Science.)

COREQUISITE(S): Students will be required to spend a minimum of 2 non-credit hours per week for a mandatory 20 hours as part of a field experience component.

PRE/COREQUISITE(S):

COURSE DESCRIPTION

This inquiry-based course involves active participation and reflection of the learning process which will promote the growth and development of equitable middle school science constructs. The Pre-service educator will apply knowledge previously acquired in individual content science courses and communicate them by designing an integrated and lab-based science curriculum unit. Students will be required to spend 2 non-credit hours per week for a mandatory 20 hours as part of a field experience component. Course completers will teach integrated science concepts using the inquiry processes as the basis for teaching and learning Science in middle schools.

UNIT TITLES

1. The Nature of Science and Scientific Inquiry
2. The Essentials of Inquiry and Constructive Based Learning
3. Assessment Strategies for Learning Outcomes
4. Laboratory Safety and Issues
5. Construction of Effective Lesson Plans
6. Science Fairs and Projects
7. Working with Diverse Learning Styles
8. Integrating Modern Technology into the Science Classroom and Lab
9. Design of the Integrated Lab Based Curriculum Unit
10. Delivery of the Curriculum Unit in a Field or Practical Setting
11. A Post Critique and Analysis of the Design and Delivery of the Curriculum Unit

EVALUATION:

Students will be assessed by objective tests for units 1 through 8.

Students will be assessed by the following criteria for their Design of Lab Based Curriculum Unit:

Students will be separately assessed by these same criteria for the delivery of their Lab Based Curriculum Units:

- organization
- clarity of thought
- consistency of thought
- reflection of course content
- thoughtful assimilation/accommodation with evidence of conceptual connections and understanding of content
- effort
- interest in the learning process
- confidence and commitment
- professional presentation
- cooperation and participation

**** Complete the following only if course is seeking general education status ****

GENERAL EDUCATION Competencies and Skills *:

Please highlight in **green** font all Competencies/Skills from the list below that apply to this course. In the box to the right of the Competency/Skill, enter all specific learning outcome numbers (i.e. 1.1, 2.7, 5.12) that apply.

1. Read with critical comprehension	
2. Speak and listen effectively	
3. Write clearly and coherently	
4. Think creatively, logically, critically, and reflectively (analyze, synthesize, apply, and evaluate)	
5. Demonstrate and apply literacy in its various forms: (highlight in green ALL that apply) (1. technological, 2. informational, 3. mathematical, 4. scientific, 5. cultural, 6. historical, 7. aesthetic and/or 8. environmental)	
6. Apply problem solving techniques to real-world experiences	
7. Apply methods of scientific inquiry	
8. Demonstrate an understanding of the physical and biological environment and how it is impacted by human beings	
9. Demonstrate an understanding of and appreciation for human diversities and commonalities	
10. Collaborate with others to achieve common goals.	
11. Research, synthesize and produce original work	
12. Practice ethical behavior	
13. Demonstrate self-direction and self motivation	
14. Assume responsibility for and understand the impact of personal behaviors on self and society	
15. Contribute to the welfare of the community	

** General Education Competencies and Skills endorsed by '05-'06 General Education Task Force*

SCE 3320

Unit 1 The Nature of Science and Scientific Inquiry**General Outcome:**

- 1.0 The student shall be able to identify the unifying concepts of scientific inquiry, identify various scientific methods and be able to identify and explain scientific competencies

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 1.1 Explain and teach how scientific inquiry is conducted.
- 1.2 Explain and teach the classical scientific method.
- 1.3 Explain and teach other scientific methods that can be used.

SCE 3320

Unit 2 The Essentials of Inquiry and Constructive Based Learning**General Outcome:**

- 2.0 The student shall be able to apply inquiry and constructive based learning strategies to the teaching of middle grades general science courses.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 2.1 Design inquiry based science labs for middle school students.
- 2.2 Design constructive learning experiences for middle school students.

SCE 3320

Unit 3 Assessment Strategies for Learning Outcomes**General Outcome:**

- 3.0 The student shall be able to identify and use various assessment strategies and learning outcomes that are used in teaching middle school general science.

Specific Measurable Learning Outcomes:**Upon successful completion of this unit, the student shall be able to:**

- 3.1 Create a pre-service instructional portfolio to include traditional and alternative assessments as demonstrated in multiple choice tests as well as rubric development and implementation.
- 3.3 Employ performance assessments to be included in the pre-service instructional portfolio.

SCE 3320

Unit 4 Laboratory Safety and Issues

General Outcome:

- 4.0 The student shall demonstrate knowledge and practice of laboratory safety issues.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 4.1 Demonstrate awareness and knowledge of various laboratory safety issues.
- 4.2 Demonstrate knowledge of how to set up and supervise safe laboratory environments.
- 4.3 Identify safety hazards in a laboratory setting.

SCE 3320

Unit 5 Construction of Effective Lesson Plans

General Outcome:

- 5.0 The student shall be able to design and construct effective lesson plans for middle school students.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 5.1 Incorporate benchmarks and strands from the Sunshine State Standards into lesson plans.
- 5.2 Develop measurable objectives for each lesson which relate back to the science benchmarks and which include audience, action, strategy and assessment.
- 5.2 Develop lesson plans that are guided by the measurable objectives and which incorporate higher levels of Bloom's Taxonomy.
- 5.3 Develop lesson plans that include effective and varied sets of assessment strategies
- 5.4 Incorporate varied sets of instructional resources and references in lesson planning.
- 5.5 Include strategies for teaching the diverse learner.

Unit 6

SCE 3320

Unit 6 Science Fairs and Projects

General Outcome:

- 6.0 The student shall be able to facilitate science fairs and projects at their schools.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 6.1 Guide advanced students with projects relating to procedural thinking.
- 6.2 Assist in science fair coordination at appropriate schools.
- 6.3 Model the construction of science fair projects.
- 6.4 Assist students in developing research-based science fair topics.
- 6.5 Effectively judge the quality of science fair projects based on a prescribed set of criteria.

SCE 3320

Unit 7 Working with Diverse Learning Styles

General Outcome:

- 7.0 The student shall be familiar with diverse learning styles as they apply to the teaching of middle grades general science.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 7.1 Incorporate various teaching styles to address all learners' needs.
- 7.2 Incorporate current practices in exceptional education into teaching lab based science lessons.
- 7.3 Design and implement alternative assessment strategies as required by IEP and other accommodations.

SCE 3320

Unit 8 Integrating Modern Technology into the Science Classroom and Lab

General Outcome:

- 8.0 The student shall be familiar with the host of modern teaching technologies that exist for the teaching of science, and be able to include them in the design of laboratory based science courses. These should include, but not be limited to computers, computer learning software, computer laboratory software and hardware, presentation devices such as projection microscopes, video projectors, interactive whiteboards, and others.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 8.1 Incorporate technology literacy skills in the development of lesson plans.
- 8.2 Incorporate electronic accessories into lab based instructional units.
- 8.3 Infuse new technologies into daily teaching and lesson plans.

SCE 3320

Unit 9 Design of the Integrated Lab Based Curriculum Unit

General Outcome:

- 9.0 The student shall be able to design a lab based curriculum unit.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 9.1 Construct an effective lab within the curriculum unit which is ready for face to face or online delivery.
- 9.2 Prepare all of necessary physical components for a science lab focusing on efficacy, efficiency and safety.

SCE 3320

Unit 10 Delivery of the Curriculum Unit in a Field or Practical Setting

General Outcome:

- 10.0 The student shall be able to deliver their lab based curriculum unit in a class setting.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 10.1 Present curriculum unit or an individual lesson within the curriculum unit using appropriate science educational tools as assessed by an instructor-developed rubric.

SCE 3320

Unit 11 A Post Critique and Analysis of the Design and Delivery of the Curriculum Unit

General Outcome:

11.0 The student shall be able to receive feedback on their delivered curriculum presentation from their supervising instructor, and be

able to modify their teaching style and presentation to become more effective.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

11.1 Modify original curriculum unit plan to reflect instructor feedback.

11.2 Discuss revised plan with instructor in individual feedback sessions.