

The Citadel
School of Education
Science Lesson Plan Guidelines
(adapted for use for Science Instruction by Dr. Kathryn Richardson Jones
from revised Citadel form created by Dr. Lauren Rule Maxwell)

This assignment will:

- Document your ability to plan lessons that demonstrate that you have the content knowledge, pedagogical knowledge, and content pedagogical knowledge necessary to provide effective instruction for all students;
- Demonstrate that you can develop differentiated learning goals, learning activities, and assessments that are appropriate for each student and that you can make adaptations—both accommodations and modifications—when additional intervention is needed;
- Illustrate that you can use varied assignments to inform instruction, evaluate performance, and ensure student learning; and
- Demonstrate that you can plan and deliver effective instruction that advances the learning of each student.

To complete this assignment you must:

- Use The Citadel Science Lesson Plan format to create a complete lesson that addresses each element of the lesson plan,
- Teach the lesson, and
- Reflect on the lesson you've taught.

A planning and assessment grading rubric follows this form. Please keep the items listed under "Competent" in mind as you prepare your plans. You may submit your plans for review and then correct areas as suggested by your professor. (See course syllabi or Guidelines For Student Teaching Internship Handbook.)

For your program completion portfolio, you will need to upload examples of your planning, teaching and assessing in the following areas:

- Safety. (NSTA 9) - Standard 9. Safety and Welfare.** Teachers of science organize safe and effective learning environments that promote the success of students and the welfare of all living things. They require and promote knowledge and respect for safety, and oversee the welfare of all living things used in the classroom or found in the field. To show that they are prepared, teachers of science must demonstrate that they:
 - (a) understand the legal and ethical responsibilities of science teachers for the welfare of their students, the proper treatment of animals, and the maintenance and disposal of materials.
 - (b) know and practice safe and proper techniques for the preparation, storage, dispensing, supervision, and disposal of all materials used in science instruction;
 - (c) know and follow emergency procedures, maintain safety equipment, and ensure safety procedures appropriate for the activities and the abilities of students;
 - (d) treat all living organisms used in the classroom or found in the field in a safe, humane, and ethical manner and respect legal restrictions on their collection, keeping, and use.

- **Nature of Science. (NSTA 2)** Teachers of science engage students effectively in studies of the history, philosophy, and practice of science. They enable students to distinguish science from non-science, understand the evolution and practice of science as a human endeavor, and critically analyze assertions made in the name of science. To show they are prepared to teach the nature of science, teachers of science must demonstrate that they:
 - (a) understand the historical and cultural development of science and the evolution of knowledge in their discipline;
 - (b) understand the philosophical tenets, assumptions, goals, and values that distinguish science from technology and from other ways of knowing the world;
 - (c) engage students successfully in studies of the nature of science including, when possible, the critical analysis of false or doubtful assertions made in the name of science.

- **Inquiry. (NSTA 3)** Teachers of science engage students both in studies of various methods of scientific inquiry and in active learning through scientific inquiry. They encourage students, individually and collaboratively, to observe, ask questions, design inquiries, and collect and interpret data in order to develop concepts and relationships from empirical experiences. To show that they are prepared to teach through inquiry, teachers of science must demonstrate that they:
 - (a) understand the processes, tenets, and assumptions of multiple methods of inquiry leading to scientific knowledge;
 - (b) engage students successfully in developmentally appropriate inquiries that require them to develop concepts and relationships from their observations, data, and inferences in a scientific manner.

- **Issues. (NSTA 4)** Teachers of science recognize that informed citizens must be prepared to make decisions and take action on contemporary science- and technology-related issues of interest to the general society. They require students to conduct inquiries into the factual basis of such issues and to assess possible actions and outcomes based upon their goals and values. To show that they are prepared to engage students in studies of issues related to science, teachers of science must demonstrate that they:
 - (a) understand socially important issues related to science and technology in their field of licensure, as well as processes used to analyze and make decisions on such issues;
 - (b) engage students successfully in the analysis of problems, including considerations of risks, costs, and benefits of alternative solutions; relating these to the knowledge, goals and values of the students.

- **Science in the Community. (NSTA 7, SC-EEDA)** Teachers of science relate their discipline to their local and regional communities, involving stakeholders and using the individual, institutional, and natural resources of the community in their teaching. They actively engage students in science-related studies or activities related to locally important issues. To show that they are prepared to relate science to the community, teachers of science must demonstrate that they:
 - (a) identify ways to relate science to the community, involve stakeholders, and use community resources to promote the learning of science;
 - (b) involve students successfully in activities that relate science to resources and stakeholders in the community or to the resolution of issues important to the community.
 - (c) integrate career connections and pathways into their instruction. (SC-EEDA)

**THE CITADEL
SCIENCE LESSON PLAN FORM**
(adapted for use for Science Instruction by Dr. Kathryn Richardson Jones
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Teacher _____ Subject _____ Grade _____

I. Learning Goals – NSTA 2003 – 1.b

National Science Teaching Standard addressed with this lesson:

Note: The National Science Education Standards are available at:

South Carolina State Science Standard(s) addressed with this lesson:

Note: South Carolina Science Education Standards are available at:

Indicator(s):

What will your students know and be able to do at the end of this lesson?

II. Student Background Knowledge and Experience - NSTA 2003 – 1.a

What prior knowledge and skills do students need in order to be successful in reaching the goals of this lesson?

How do you know if students have the knowledge and skills they need to be successful?

How will you use or accommodate the diverse experiences that your students bring to class (considering gender, race/ethnicity, English language proficiency, economic status, exceptionalities, skill level, and learning styles)?

III. Instructional Procedures NSTA 2003 – 2.b

Content summary, including concepts and essential understandings:

Teaching methods:

Safety Considerations - NSTA 2003 – 1.E and S1-3

Legal and Ethical NSTA 2003 – S1	Chemical Safety NSTA 2003 – S1	Safety Procedures/Equipment NSTA 2003 – S1	Living Organisms NSTA 2003 – S1

Student grouping:

IV. Resources and Materials including Technology and Career Connections and Community Resources - NSTA 2003 – 1.E, 4, 7, ISTE-NETS, and SC-EEDA

V. Science Related Issues - NSTA 2003 – 4.a and b

How will you engage your students in learning about and analysis of problems, including considerations of risks, costs, and benefits of alternative solutions; relating these to the knowledge, goals and values of the students?

VI. Instructional Activities - NSTA 2003 – 2.b

Lesson sequence, including important questions to ask students

Time Allotted

Opening:

Main activities:

Closing:

VII. Assessment/Evaluation NSTA 2003 – 2.C

How will you know if each student has met the learning goals? Attach assessments and assessment criteria.

VIII. Adaptations NSTA 2003 – 1.B

Modifications: Note if lesson objective or significant content needs to be changed.

Accommodations: Note if other components of the lesson need to be changed.

Use the chart below to outline specific adaptations.

Student Name				
What needs are you addressing for this student in this lesson?				
Learning Goals Modification to indicator and/or what student will be expected to know or do				
Teaching Methods				
Teaching Materials				
Student Activities				
Student Materials				
Assessment/ Evaluation				

IX. Reflection (after teaching lesson):NSTA 2003 – 2.C

If you could teach this lesson again, what would you do the same?

What would you do differently?

Were there any additional safety considerations that you would make if you teach this lesson again? NSTA 2003 – S1-4

Which individual or group did particularly well?

How do you account for this performance?

What might you try in the future with this individual or group?

Which individual or group appeared to be having problems?

How do you account for this performance?

What might you try in the future with this individual or group?

Rubrics for Assessing the Lesson Plan Assignment and Unit Work Samples

APS 2 - Short-Range Planning – APS 3 –Short Range Planning, Development and Use of Assessments

	Competent	Developing Competence	Unsatisfactory
<p>2A. Section I: Major Unit Objectives Unit objectives facilitate student achievement of academic standards and long-range learning and developmental goals (NSTA 6.a, 6.b) SC-ADEPT – 06.2.A</p>	<p>Unit fulfills the requirements for the content area and grade level and is aligned to State and National Science Standards.</p> <p>Appropriate Objectives for the grade level and Science content area.</p> <p>Observable Objectives are stated in the learner outcomes and can be easily measured and evaluated.</p> <p>Student Involvement Objectives require students to be actively involved in the learning process.</p> <p>Matched to Skills Objectives All objectives have been accurately matched with the required skills to master the objective.</p>	<p>Unit is adequate for the content area and/or grade level and shows evidence of alignment to State and National Science Standards.</p> <p>Objectives are somewhat appropriate for the Science content area and/or the grade level.</p> <p>Observable objectives are stated in the learner outcomes but are not easily measured and/or evaluated.</p> <p>Objectives require students to have some active involvement in the learning process.</p> <p>2 or 3 of the objectives have been accurately matched with the required skills to master the objective.</p>	<p>Unit shows no evidence of alignment to State and National Science Standards and do not appear to be appropriate for content area and/or grade level.</p> <p>Objectives are not appropriate for the Science content area and grade level.</p> <p>Objectives are not stated in observable learner outcomes and cannot be measured.</p> <p>Objectives indicate students are passive recipients of knowledge.</p> <p>One or none of the objectives have been matched with the required skills to master the objective.</p>
<p>2.B.1 Section II: Unit Plan Instructional plans include content, strategies, materials and resources appropriate for the students. (NSTA 6.b, 7.a, 7.b) SC-ADEPT-06.2.B</p>	<p>Appropriate/ Accurate Science Content for the instructional area and grade level is evident.</p> <p>Content is aligned to State and National Science Standards.</p> <p>Matching Materials Each lesson plan contains a comprehensive materials/ resource list.</p> <p>Logically sequenced strategies including at least 2 instructional strategies per objective</p> <p>Logically sequenced strategies provide opportunities for students to reflect on their learning process. Students communicate in some form about what they learned, how they learned it, and how they plan to use the information.</p> <p>Logically sequenced strategies promote an understanding of the purpose and use of content information and/or language.</p> <p>Strategies promote active engagement of students through problem solving/ creativity.</p> <p>Strategies for collaboration/ independent learning/ varying group sizes. Instructional strategies provide opportunities for the teacher to work with whole class, small groups and/or individuals including collaboration and independent learning.</p>	<p>Science Content is accurate and somewhat appropriate for the instructional area and/or grade level.</p> <p>Content demonstrates some alignment to State and National Science Standards.</p> <p>Each lesson plan contains a materials list.</p> <p>Each objective contains less than two appropriate instructional strategies that may or may not be logically sequenced.</p> <p>Lesson plans incorporate limited opportunities for students to reflect on their learning process. The reflection activity is informal</p> <p>Lesson plans demonstrate how language and/or content information are used but do not indicate a clear purpose of the information and/or language.</p> <p>Instructional strategies are creative and offer some opportunities for the students to become actively involved</p> <p>Instructional strategies provide minimal opportunities for the teacher to work with whole class, small groups and/or individuals including collaboration and independent learning.</p>	<p>The Science content is not accurate or appropriate for instructional area and/or grade level.</p> <p>Content is not aligned to State and National Science Standards.</p> <p>Materials lists are either not available or are incomplete.</p> <p>Each objective does not contain appropriate or logically sequenced instructional strategies.</p> <p>Lesson plans do not incorporate any opportunity for students to reflect on their learning process.</p> <p>Lesson plans do not clearly demonstrate the purpose and use of the content information and/or language.</p> <p>Instructional strategies offer few or no opportunities for the students to become actively involved.</p> <p>Instructional strategies do not provide opportunities for the teacher to work with whole class, small groups and/or individuals including collaboration and independent learning.</p>

	Competent	Developing Competence	Unsatisfactory
2.B.2 - Section II: Unit Plan Incorporation of Technology (ISTE-NETS 1 and 3) (NSTA 4, 6, 7.a, 7.b) SC-ADEPT-06.2.B	<p>Incorporation of Technology. Unit plans demonstrate the use of technology in an effective manner to promote learning.</p> <p>Science and technology related issues are included in the lesson plans and candidates incorporated analysis of their integration of these practices into their lesson plans.</p>	<p>Unit plans demonstrate the use of technology to promote learning.</p> <p>Plans include evidence of incorporation of science and technology related issues but not an analysis.</p>	<p>Unit plans lack evidence supporting the use of technology to promote learning.</p> <p>Plans lack evidence of incorporation of science and technology related issues</p>
2.B.3 Section II: Unit Plan Career and Community Connections (EEDA) (NSTA 6, 7.a, 7.b)	<p>Connections to other content areas, career pathways and community resources. Unit and lesson plans integrate other subject area standards and career pathways into the instructional unit.</p>	<p>Unit and lesson plans could be associated with other content area standards and/or career pathways, but the connections are not clearly explained.</p>	<p>Lesson plans do not integrate other subject area standards or career pathways into the instructional unit.</p>
2C. Section V: Response to Formative Analysis Student performance data is used to guide short-range planning of instruction. (NSTA 6.b, 7.a, 7.b, 8.c) SC-ADEPT-06.2.C	<p>Adjustments to Science unit plan were made based on student behavior, progress and performance data; and</p> <p>Reflected on the need to adjust unit plan for future use.</p>	<p>Science Lesson plans partially focus on the student but fail to take into account all required learner needs.</p> <p>Science Lesson plans document minimal modifications for specific learning differences among individual students.</p>	<p>Science Lesson plans do not take into account the age or grade level of the student or accommodate for learner needs.</p> <p>Science Lesson plans do not document modifications for specific learning differences among individual students.</p>
3B. Section IV: Analysis of Student Performance At appropriate intervals, student performance data is gathered and accurately analyzed to guide instructional planning. (NSTA 8.a, 8.b) SC-ADEPT-06.3.B	<p>Teacher candidate regularly analyzes and uses assessment results to monitor, modify and/or enhance learning throughout the unit.</p>	<p>Teacher candidate occasionally analyzes and uses assessment results to monitor, modify and/or enhance learning.</p>	<p>Teacher candidate does not analyze and/or use assessment results to monitor, modify and/or enhance learning.</p>
3C. Section VI: Summative Feedback Assessment data used to determine grades that accurately reflect student progress and achievement. (NSTA 8.a, 8.b) SC-ADEPT-06.3.C	<p>Made decisions about student performance, progress, and achievement based on alignment with the unit objectives, the assessments, and the ability levels of the students.</p> <p>Maintained accurate, current, well-organized and confidential records of assessment results.</p>	<p>Made decisions about student performance based on some of the criteria.</p> <p>Maintained records with varying levels of organization and keeping current.</p>	<p>Made decisions about student performance based only on assessments.</p> <p>Maintained records in an unorganized, late manner.</p>

