Assessment 3

Unit Plan

A. Description of Assessment

The Unit Plan is a generic assignment that all secondary education students at the College of Charleston must complete. The secondary biology, chemistry, and physics candidates must complete this Unit Plan with science-specific learning outcomes. The Unit Plan is completed in the methods course for graduate and undergraduate candidates (EDFS 456 – Teaching Strategies in the Content Areas), which is taken the semester prior to clinical internship (EDFS 460 – Clinical Practice in the Content Area). Candidates must also implement part of the Unit Plan as part of their practicum experience during this semester. During implementation, candidates are evaluated on their teaching.

B. Alignment with NSTA Standards

The Unit Plan is aligned with the NSTA Standards 1c, 2a-c, 3a-d, and 4a-c. The directions of the Unit Plan contain the science-specific learning outcomes that are aligned with the specific NSTA element.

C. Assessment Tool and Assignment

Unit Plan

In EDFS 456 Teaching Strategies in the Content Area

Instructions: The student teacher should:

1. Create a 10-day unit plan.
2. Arrange with the cooperating teacher to teach this unit (all if not most of it) during the student teaching period.
3. Provide assessment of student learning of the concepts.

I. Unit Overview (Record the following information).

- Name: __________________________________________________________
- Intended Grade Level: _____________________________________________
- Class (Science, Biology): ___________________________________________
- Unit: ___________________________________________________________
- Topic: ___________________________________________________________
- Next Generation Science Standards: ________________________________

List:
Note: It is OK to use more than one Standard, Sub-Heading, or fundamental concept/principle

a. South Carolina and Next Generation Science Standards (NGSS)  
List (copy and paste entire statements):

1) Standard or Performance indicator  
2) Benchmark  
3) Grade-level indicator (this is a statement, not a number).

b. Materials and Recourses needed for Entire Unit:  
What lab or demonstration materials will be needed? Try to complete. Be sure to include the “obvious” materials here: If you plan to use an overhead projector, write “overhead projector”, “overhead sheets”, “Vis-à-vis markers”, etc.; if you plan to use the textbook, write “textbook”. This should be a master list that you can use to prepare for an upcoming unit, so rather than having materials broken down by day, have them grouped by type (e.g., Chemicals from Stockroom; Consumables; Text Materials; Lab Equipment; Demonstration Apparatus; etc.)

c. Summative Assessment:  
At the conclusion of the unit, how will you determine whether or not your students achieved the NGSS and South Carolina Standards that you listed above? The Unit Plan must include assessment measures that are tied to the learning objectives. Some assessment measures must also support students’ self-reflection and self-evaluation.

II. Daily Lesson Plans (You will write one of these for each day for total of 10).

a. Instructional Objectives (State your objectives):

Be sure to stay focused –these should be tied to the Standards, but not written in the same way.

b. Intended Grade Level

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>Min.</td>
<td></td>
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<tr>
<td>Min.</td>
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</table>

c. Materials and Resources needed for the Lesson:

What lab or demonstration materials will be needed? Try to complete. Be sure to include the “obvious” materials here: If you plan to use an overhead projector, write “overhead projector”, “overhead sheets”, “Vis-à-vis markers”, etc.; if you plan to use the textbook, write “textbook”.

d. **Assignment:**

Use an assignment that will demonstrate the students’ understanding of the material you presented.

e. **Diagnostic or Formative Assessment**

Concentrate on how you will know whether or not the students are “getting it” during the lesson, not how you will evaluate them at the end of the unit. This needs to be tied to your instructional objectives for the lesson. Some assessment measures must also support students’ self-reflection and self-evaluation.

**III. TOPICS TO BE COVERED IN THE UNIT**

As you consider the scope and sequence of the unit and the details of your lessons, keep in mind the following requirements for your Unit Plan:

1. Science content must be accurate and grade-appropriate. The Unit Plan should indicate your understanding of the students’ likely mistake/misconceptions regarding the topic(s) to be covered. Attention should also be given to Unifying Concepts.

   The “Unifying” Concepts include:
   
   a. Illustrating the differences between scientific and nonscientific ways of understanding the world. Also, understanding how scientific knowledge is organized (e.g., the Linnaean system of classification).
   b. Understanding the nature of scientific evidence (e.g. The importance of experimental blinding) and the use of models in scientific explanation (e.g. the Bohr atom is useful for understanding, but not incomplete).
   c. The centrality of careful measurement to determining things that stay the same (e.g., the charge of an electron or the local acceleration due to gravity) and things that changes over time (e.g., continental positions, the earth’s magnetic field system, species population densities).
   d. Evolution of natural systems and the causes for such evolution.
   e. Interrelationships of form and function in living or nonliving systems (e.g. the fish maw [“swim bladder”] for regulating buoyancy the structure of the sun).

2. Each lesson plan will include one of the following learning objectives which are specifically tied to a 2012 NSTA Preservice Standard element.
   
   a. Each lesson plan should include the state and, if applicable, the NGSS standard and indicator (NSTA 1c).
   b. The lesson plans should use a variety of inquiry approaches that demonstrate how students learn (NSTA 2a).
   c. Lessons that include active inquiry activities in which students collect and interpret data and communicate concepts from empirical experiences (NSTA 2b).
   d. A lesson or lessons that use instruction and assessment strategies that confront student naïve concepts (NSTA 2c).
e. Lessons that use a variety of strategies that demonstrate candidates’ knowledge of selecting appropriate activities (e.g., labs, field settings, and activities) (NSTA 3a).

f. Plans that include active inquiry lessons in which students collect and interpret data in order to develop concepts, relationships and natural patterns from empirical experiences (NSTA 3b).

g. Develop assessment strategies that are fair and equitable to analyze student learning, and continuously evaluate preconceptions that students hold (NSTA 3c).

h. Plan a learning environment and experiences for all students that demonstrate chemical safety, safety procedures, and ethical treatment of living organisms (NSTA 3d).

i. If needed, each lesson plan should include the safe and proper techniques of the preparation, dispensing, and disposal of chemicals and materials (NSTA 4a).

D. Grading Rubric and Scoring Guide

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Target (3 pts.)</th>
<th>Acceptable (2 pts.)</th>
<th>Unacceptable (1 pt.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standards</strong></td>
<td>- providing conclusive and convincing evidence that candidates understand state and national curriculum standards and how the standards impact candidate content knowledge for all students.</td>
<td>- providing clear evidence that candidates understand state and national curriculum standards and how the standards impact candidate content knowledge for all students.</td>
<td>- providing insufficient evidence that candidates understand state and national curriculum standards and how the standards impact candidate content knowledge for students.</td>
</tr>
<tr>
<td><strong>Element 1c</strong></td>
<td><strong>Inquiry Approaches</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan multiple lessons using a variety of inquiry approaches.</td>
<td>- providing innovative and detailed lesson plans and a variety of assessments using multiple inquiry approaches.</td>
<td>- providing clear and consistent evidence that multiple lesson plans and a variety of assessments use multiple inquiry approaches.</td>
<td>- providing insufficient lesson plans and assessments using multiple inquiry approaches.</td>
</tr>
<tr>
<td><strong>Students’ Diverse Backgrounds &amp; How they Learn</strong></td>
<td>- including creative and detailed methods for addressing students’ diverse backgrounds and how they learn.</td>
<td>- including clear and consistent methods for addressing students’ diverse backgrounds and how they learn.</td>
<td>- including insufficient methods for addressing students’ diverse backgrounds and how they learn.</td>
</tr>
</tbody>
</table>

E.
<table>
<thead>
<tr>
<th>Activities for Data Collection</th>
<th>Include active inquiry lessons where all students collect and interpret data in order to develop and understand scientific processes.</th>
<th>- including many creative and detailed lessons, activities, and laboratory investigations where students understand how to collect, interpret, and communicate data.</th>
<th>- documenting many clear and consistent lessons, activities, and laboratory investigations where students understand how to collect, interpret, and communicate data.</th>
<th>- documenting few or no lessons, activities, and laboratory investigations where students collect, interpret, and communicate data.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of Data</td>
<td>Include active inquiry lessons where students collect and interpret data in order to understand relationships and natural patterns from empirical experiences.</td>
<td>- showing how students creatively use their own data to analyze observations and phenomena, and how the analysis leads to understanding natural patterns and relationships within scientific fields.</td>
<td>- showing how students consistently use data to analyze observations and phenomena, and how the analysis leads to understanding natural patterns and relationships within scientific fields.</td>
<td>- providing insufficient evidence of how students use and analyze data.</td>
</tr>
<tr>
<td>Science-Specific Technology</td>
<td>Applications of science-specific technology are included in the lessons when appropriate.</td>
<td>- consistently including science-specific technology into many lessons.</td>
<td>- including some science-specific technology into some lessons.</td>
<td>- including limited or no science-specific technology in lessons.</td>
</tr>
<tr>
<td>Assessments</td>
<td>Design instruction and assessment strategies that confront and address naïve conceptions/preconceptions.</td>
<td>- designing innovative and detailed lesson plans and assessments that explicitly take into account students’ prior knowledge and naïve conceptions.</td>
<td>- designing clear and consistent lesson plans and assessments that take into account students’ prior knowledge and naïve conceptions.</td>
<td>- designing insufficient lesson plans and assessments that take into account students’ prior knowledge.</td>
</tr>
<tr>
<td>Naïve Conceptions</td>
<td>Design instruction and assessment strategies that confront and address naïve conceptions/preconceptions.</td>
<td>- designing creative lesson plans that help students address naïve conceptions/preconceptions.</td>
<td>- designing clear and consistent lesson plans that help students address naïve conceptions/preconceptions.</td>
<td>- designing insufficient and non-consistent lesson plans that help students address naïve conceptions/preconceptions.</td>
</tr>
</tbody>
</table>
| Selection of Teaching & Learning Activities  
**Element 3a**  
Use a variety of strategies that demonstrate understanding of how to select the appropriate teaching and learning activities. | - providing a consistent sequence of study that shows a detailed progression of learning over time toward a more expert level of understanding that is consistent with state and/or national science education standards. | - providing a consistent sequence of study that reflects the state or national science education standards. | - providing a sequence of study that fails to sufficiently relate the goals/objectives of state or national science education standards. |
| **Lessons Include Laboratory or Field Experiences  
Element 3a**  
Use a variety of laboratory or field settings and applicable instruments and/or technology. | - providing conclusive and convincing evidence that candidates effectively integrate into the sequence of study scientific investigations through laboratory or field experiences. | - providing clear and consistent evidence that candidates use laboratory and/or field experiences in the lessons. | - providing insufficient evidence (absent, minimal or superficial) that candidates use laboratory and/or field experiences. |
| **Lessons Include and Motivate All Students  
Element 3a**  
Include strategies that are inclusive and motivating for all students. | - providing abundant experiences that are inclusive and motivating for all students. | - providing consistent experiences that are inclusive and motivating for all students. | - does not provide experiences that motivate and include all students. |
| **Plan Inquiry Lessons Using Students’ Prior Knowledge  
Element 3b**  
Develop lesson plans that include active inquiry lessons. | - providing evidence that candidates plan a variety of innovative and detailed inquiry lessons in which students use prior knowledge and experiences to design experiments. | - providing clear and consistent evidence that candidates plan inquiry lessons in which students collect, analyze, and interpret data. | - providing insufficient evidence that candidates plan lessons in which students collect, analyze, and interpret data. |
| **Plans Lessons to Show Students’ Use of Data  
Element 3b**  
Develop lesson plans where students collect and interpret data. | - convincingly documenting that students can collect, analyze, and interpret data. | - clearly documenting that students can identify relationships and patterns from data they collected. | - Does not document how students use data. |
### Plans Lessons to Show Students’ Analysis of Data
**Element 3b**
Develop lesson plans that demonstrate student understanding of scientific processes, relationships, and natural patterns from empirical experiences.

- showing that students’ analyses of data allow them to conclusively and convincingly identify relationships and patterns in the science fields.
- clearly demonstrating how student literacy for all students is achieved.
- Does not show how students analyze data.

### Plans Lessons to Show Science-specific Technology
**Element 3b**
Develop lesson plans that uses applicable science-specific technology.

- conclusively showing how science-specific technology is use.
- clearly showing how science-specific technology is used.
- does not provide science-specific technology in lessons.

### Plans Assessment Strategies for Student Learning
**Element 3c**
Plan fair and equitable assessment strategies to analyze student learning and to evaluate if learning goals are met.

- providing conclusive and convincing evidence that candidates plan a variety of fair and equitable diagnostic, formative, and summative assessment strategies that monitor progress toward, and achievement of, stated learning goals.
- providing clear and consistent evidence that candidates plan a variety of fair and equitable diagnostic, formative, and summative assessment strategies that monitor progress toward, and achievement of stated learning goals.
- providing insufficient evidence that candidates plan a variety of fair and equitable diagnostic, formative, and summative assessment strategies that monitor progress toward, and achievement of stated learning goals.

### Plans Continuous Assessment of Students
**Element 3c**
Design assessment strategies that continuously evaluate preconceptions and ideas that students hold.

- providing conclusive and convincing evidence that candidates continuously assess student preconceptions and ideas.
- providing clear and consistent evidence that candidates continuously assess student preconceptions and ideas.
- Providing insufficient or no evidence that assessments evaluate student preconceptions.
| Safe Learning Experiences | — providing evidence that candidates plan extensive learning experiences that require consideration of chemical safety, safety procedures and the ethical treatment of living organisms as it applies to their particular science field. | — providing evidence that candidates consistently plan appropriate and detailed learning experiences that require consideration of chemical safety, safety procedures and the ethical treatment of living organisms as it applies to their particular science field. | — providing insufficient evidence that candidates can create a safe learning environment. |
| Safe learning Environment | — providing conclusive and convincing evidence that candidates can create a safe learning environment. | — providing consistent evidence that candidates can create a safe learning environment. | — providing insufficient evidence that candidates can create a safe learning environment. |