**5300:420 Instructional Techniques in Science**

**5500: 520 Advanced Instructional Techniques**

Unit Plan Requirements

“Science and technology influence every aspect of our lives. From health to climate change and from bioethics to energy, a myriad of personal and societal issues requires citizens to make informed decisions based on science and technology. These issues provide a rich and motivating context in which students can learn the principles and practices of science and technology” ([NSTA, 2010](http://www.nsta.org/about/positions/societalpersonalissues.aspx)).

Teacher 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 are expected to 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 (NSTA, 2003).

To show this understanding, you will design a unit plan centered around a socio-scientific issue, that will engage students in using scientific practices to build understanding of science concepts, and to show connections between science and contemporary issues.

Your unit must include the following science-specific components:

1. Identify learning goals tied to state (New Ohio Learning Standards) and national standards (NGSS).
2. Identify **science practices** addressed in your unit. Your lessons must engage students in developmentally appropriate inquiries where they develop the concepts from observations, data, and inferences. Inquiry can be teacher guided or open ended, but it is not a “step-by-step” lab.
3. **Safety** precautions should be stated
4. Formative and Summative **Assessments**.
5. Content:
   1. The science content must be accurate and grade-appropriate. You can consult textbooks or the standards to figure out what is appropriate at a particular grade level.
   2. Address **possible students’ misconceptions**.
   3. Relate the content to students’ personal lives, and to everyday technological applications
6. Identify **Community Resources** that can be used in your unit.
7. The unit plan should address a relevant**societal issue or problem**. You need to guide your students in analyzing the issue or the problem, including considerations of risks and benefits, and considerations of alternative solutions. Guide your students to differentiate the science from the non-science of the issue or problem.
8. Address interdisciplinary connections (connections to Math, Social Studies, LA, Arts, etc.)

**SEE ATTACHED TEMPLATE FOR MORE INFORMATION**

**Unit Plan Rubric**

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| **Feature** | **Unacceptable (1)** | **Acceptable (2)** | **Accomplished (3)** | **Score** |
| **Content**  **(NSTA, 2a)** | Content contains major inaccuracies or is not developmentally appropriate. | Content is accurate and grade-appropriate.  Likely misconceptions addressed. | Content is accurate and presented in-depth. Connections between concepts are made clear to students. Likely misconceptions addressed. |  |
| **Personal and technological applications**  **(NSTA, 2c)** | No connection made to the personal lives of students | Content is connected to students’ lives or to a technological application. | Several connections are made throughout the unit to students’ lives and technological applications of science, or ties are particularly creative or insightful. |  |
| **Planning: goals/objectives**  **(NSTA,1c)** | Goals and objectives are not focused on student learning or are vague.  Standards are missing or not connected to the topic. | Objectives are written with focus on student learning.  Standards are listed and are appropriate. | In addition to acceptable performance, a clear rationale is given for how the goals/objectives are designed to meet students’ needs. |  |
| **Planning: instructional methods and activities**  **(NSTA 3a, 3b)** | Instructional methods and activities are not adequate to meet the objectives. | Activities are connected to the standards, are appropriate for the grade level and content, and support the learning objectives | Activities are creative and student centered.  Reasonable rationale provided for why the instructional methods are chosen. |  |
| **Scientific inquiry**  **(NSTA 2a, 2b)** | None of the lessons is planned as inquiry, or inquiry is confused with step by step lab work | At least one lesson is well developed as inquiry, where students develop concepts through open or guided inquiry: being engaged in asking questions, making observations, collecting data, and making inferences. | Two or more lessons are well developed as inquiry, where students develop concepts through open or guided inquiry: being engaged in asking questions, making observations, collecting data, and making inferences. Or the whole unit is conceived as an inquiry project. |  |
| **Science-related issues**  **(NSTA 2a)** | Science related issues are introduced casually or implied and given no deep treatment. | Lessons engage students in analyzing science related issues or problems, separating the science from the non-science. Alternative solutions proposed or multiple values presented and analyzed. | Lessons engage students in analyzing science related issues or problems, separating the science from the non-science. Alternative solutions proposed or multiple values presented and analyzed. Decisions are supported with evidence.  Issues selected are important and relevant to students’ lives. |  |
| **Assessment**  **(NSTA, 3c)** | Assessment is not varied (only one type is used), or is not above the knowledge-level for the most part. | At least two different assessment strategies are used in the unit.  Assessment are aligned with the lesson objectives.  Summative assessment at the end of the unit is appropriate. | Three or more assessment strategies are used (formative and summative).  Assessments are aligned with the objectives and students are given opportunities to reflect on their own learning (students’ self analysis of their own work). |  |
| **Science in the community** | Community resources are not utilized or do not connect to the unit goals. | Community resources are utilized, but may not explicitly tie to unit goals and objectives. | Community resources (museums, guest speakers, etc.) are utilized; these resources clearly advance the Unit goals and objectives and help familiarize students with unique situations or opportunities in the local area. |  |
| **Mechanics and Organization** | Unit is weak and not internally coherent.  Many spelling and grammar mistakes. | Unit is internally coherent.  Few grammar and spelling mistakes. | Unit scope and sequence flows very well.  No grammar and spelling mistakes. |  |
| **Total Points** |  |  |  |  |