

Warner School of Education – University of Rochester
INNOVATIVE UNIT: SCIENCE

Guidelines for teacher candidates

All teacher candidates are required to design and implement innovative units in their student teaching and/or practicum experiences. As in the case of lesson plans, we believe it is important in at least one case to make your thinking processes about design, implementation, and assessment explicit. The following guidelines explain the minimum required components we expect in innovative unit papers. This assessment, in conjunction with final student teaching evaluations, will determine if a candidate will “pass” student teaching. Assessment of the innovative unit paper will occur on two levels: 1) Candidate ability to design, implement, and analyze the unit as described in these guidelines, and 2) Candidate ability to address in the unit the relevant standards set by their professional organization and Warner School proficiencies. The rubric is divided into three parts and is included in this packet. Content area faculty may provide additional rubrics specific to that specialization.

Required Unit Components:

- 1. Introduction:** This section should provide a brief description of the unit that gives a context for the components of the unit, including an essential question and/or topic addressed if appropriate. Include a clear description of the context of implementation for the unit, including grade level, racial, ethnic and gender make-up of students and teachers, a description of the school and classroom, and whether the implementation occurred in the first or second student teaching/practicum experience.
- 2. Theoretical framework:** Provide a clear, well thought out theoretical framework that both guides and provides a foundation for, the unit, using course readings (and outside readings where appropriate). Candidates should state their definition of the content area addressed and their theory of learning. In other words, how does your definition of [literacy, language, science, math, English, social studies] and theory of learning frame the unit? This section should also include a clear rationale for the unit (e.g. why is this unit important? Why will student learning be meaningful and relevant in this unit?).
- 3. Goals/Professional Standards:** Describe the overarching goal/s of the unit and connect the goal/s to the larger curriculum in your class (the specific content area). Discuss the professional and/or state standards this unit addresses. Make explicit the specific content addressed and connections to the theoretical framework, curriculum, and overarching unit goal/s.
- 4. Objectives:** Clearly articulate the specific unit objectives and connect these objectives to the unit goals and professional standards – See #7 below for some specific objectives that need to be included.
- 5. Assessment of Student Learning over Time:** Describe the multiple forms of assessment used across the unit. Include formative, summative, formal, and informal assessments. Explicitly connect your assessment to the theoretical framework, unit goals and objectives,

and professional standards. In other words, how will your assessments help you scaffold student learning over time and how will you know you have accomplished your goals? How will your assessments inform instruction?

6. **Pedagogy:** Describe the series of connected lessons and/or experiences in the unit. Include your detailed lesson plans for selected lessons in this section using the lesson plan format given to you. Describe in detail how you will scaffold and support student learning over time, and address any relevant safety considerations.
7. **Unit Implementation:** Describe what happened when you implemented this unit, with particular attention to students' responses to its main activities. Reflect on what went well and what you would change in future implementations.

Specifically, consider how you addressed the following expectations of science instruction in your innovative unit. Teachers of science must demonstrate that they can:

1. Successfully convey to students the **major concepts**, principles, theories, laws and interrelationships of their field and supporting fields;
 2. Successfully convey to students the **unifying concepts** of science delineated by the National Science Education Standards (see page 104, 115-120).
 3. Successfully convey to students important **personal and technological applications** of science in their field of licensure.
 4. 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.
 5. 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.
 6. Engage students successfully in the **analysis of problems**, including considerations of risks, costs and benefits of alternative solutions; relating those to the knowledge, goals and values of students.
 7. Involve students successfully that **relate science to resources and stake holders in the community** or to the resolution of issues important to the community.
8. **Analysis of student learning:** Report the results of a systematic analysis of what your students learned as a result of the unit, making explicit references to goals and objectives, and using data from formal assessments and classroom observations (see number 5 above). Refer as appropriate to the assessment results and student work in an appendix to support your claims.
 9. **Unit Analysis:** This section is a detailed analysis of the implementation of the unit that brings together content, theory, and practice. Describe how you have integrated the components of the unit into a coherent whole that produces meaningful and relevant student learning and addresses the goals articulated in Part 2 and 3 of the rubric. Connect the unit implementation with the larger curriculum and theoretical framework described in the introduction.

10. Appendix: Include: 1) text of key assignments and assessments, including rubrics or handouts given to students; 2) aggregate assessment data; 3) samples of student work with your comments.

What follows are the rubrics that will be used to evaluate this major assessment. You are expected to provide a self-evaluation of your work using these rubrics; your methods course instructor will do the same independently.