

Science Education Program Guidelines

Rule 505-3-.28

The purpose of the science educator program standards is to provide evidence of competencies in vital areas required for teacher certification and for successful student learning. This focus provides educators with deep and broad knowledge of science content, pedagogy, assessment, and clinical practice. Programs based upon these standards will prepare science professionals who positively impact learning for every student and who advocate for and contribute to the field of science education.

The science education program standards were drawn heavily upon the National Science Teacher Association (NSTA) Standards for Science Teacher Preparation. Therefore, there is close alignment in this document with both NSTA as well as the The National Council for Accreditation of Teacher Education (NCATE). There are multiple ways that an institution may demonstrate that their candidate has mastered the required competencies for the standards aligned with that particular certification area. The suggestions here are certainly not exhaustive, but merely provide examples of how standards might be met.

Guideline 1: Content Knowledge. Effective teachers of science understand and articulate the knowledge and practices of contemporary science. They interrelate and interpret important concepts, ideas, and applications in their fields of licensure.

Previously, content knowledge competency was based upon the number of courses that a person had taken in a particular field of study. Based upon the requirements of 505-3-.28 which take effect on October 2012, and in concert with NSTA Standards for Teacher Preparation, one must be able to demonstrate that teacher candidates have mastered the indicated percentage of competencies in the core, advanced, and supporting standards.

Examples of attainment of percentages of mastery of the core, advanced and supporting competencies in the standards could be accomplished may include:

- Alignment of course content with specific standards. The template may be found on the NSTA website (<http://www.nsta.org/pd/ncate/docs/SecondaryScienceContentAnalysisForm.pdf>).
- Provide a matrix demonstrating alignment of a portfolio or other artifacts giving evidence of meeting content core, advanced and supporting competencies as indicated in the standards
- Evidence provided from field experience or student teaching evaluation forms/assessment
- Successful passing score(s) from GACE (however, this cannot be the only form of assessment)

Guideline 2: Content Pedagogy. Effective teachers of science understand how students learn and develop scientific knowledge. Preservice teachers use scientific inquiry to develop this knowledge.

Evidence of meeting this standard may include:

- Unit plan or collection of lesson plans
- Observations
- Portfolio
- Self reflection

- Student Teaching Feedback forms

Guideline 3: Learning Environments. Effective teachers of science are able to plan for engaging students in science learning by setting appropriate goals that are consistent with knowledge of how students learn science and are aligned with state and national standards. The plans reflect the nature and social context of science, inquiry, and appropriate safety considerations. Candidates design and select learning activities, instructional settings, and resources--including technology, to achieve those goals; and they plan fair and equitable assessment strategies to evaluate if the learning goals are met.

Evidence of meeting this standard may include:

- Unit plan
- Observations
- Portfolio
- Self reflection
- Student teaching feedback form

Guideline 4: Safety. Effective teachers of science can, in a P-12 classroom setting, demonstrate and maintain chemical safety, safety procedures, and the ethical treatment of living organisms needed in the P-12 science classroom appropriate to their area of licensure.

Evidence of meeting this standard may include:

- Unit plan
- Observations
- Portfolio
- Self reflection
- Student teaching feedback form

Guideline 5: Impact on Student Learning. Effective teachers of science provide evidence of P-12 students' understanding of major science concepts, principles, theories, and laws have changed as a result of instruction by the candidate and that student knowledge is at a level of understanding beyond memorization.

Evidence of meeting this standard may include:

- Unit plan
- Observations
- Portfolio
- Self reflection
- Student teaching feedback form
- Data analysis including a variety of test and other scores

Guideline 6: Professional Knowledge and Skills. Effective teachers of science strive continuously to improve their knowledge and understanding of the ever changing knowledge base of both content and

science pedagogy. They identify with and conduct themselves as part of the science education community.

Evidence of meeting this standard may include:

- Portfolio
- Journals
- Calendars/schedules/meeting note

Guideline 7: Clinical Practice/Field Experience

Program providers must provide appropriate field experiences/clinical practice for educators. Educators must document experiences working in settings that affect the learning of students. This might include working directly with students, teachers, other educational professionals or pre-service teachers through coaching, professional development or research. Since this a 6-12 certificate, it is incumbent upon the program provider to assure that the educator is well-prepared in middle and high school levels of certification.

The program shall prepare secondary science professionals who:

1. Observe and participate under supervision of qualified science professionals in a variety of settings in which children are served (such as public and private; centers, schools, and community agencies).
2. Work effectively over time with students of differing ages, with students with diverse abilities, and with students reflecting culturally and linguistically diverse family systems.
3. Demonstrate ability to work effectively during full-time supervised student teaching and field experiences in at least two different settings, serving students of two different age groups (middle school and high school) and with varying abilities.
4. Analyze and evaluate field experience, including supervised experience in working with parents, and supervised experience in working with interdisciplinary teams of professionals.
5. Demonstrate the practical skills, knowledge, and professional dispositions essential to help all 6-12 science students learn and develop.