

Program Report for the Preparation of Science Teachers

National Science Teachers Association (NSTA) 2012 Standards - Option A

NCATE approved the 2012 NSTA Standards in 2012. Beginning in Fall 2014, programs submitting reports must use the 2012 standards.

COVER SHEET

1. Institution Name

Kutztown University of Pennsylvania

2. State

Pennsylvania

3. Date submitted

MM DD YYYY

03 / 15 / 2017

4. Report Preparer's Information:

Name of Preparer:

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6. Name of institution's program

Science Education Baccalaureate

7. CAEP Category

Science Education (multiple fields)

8. Grade levels⁽¹⁾ for which candidates are being prepared

7-12

(1) e.g. K-6, 7-9, 7-12, K-12

9. Program Type
- ☒ First Teaching License
 - ☐ Unspecified
10. Degree or award level
- ☒ Baccalaureate
 - ☐ Post Baccalaureate
 - ☐ Master's
 - ☐ Post Master's
 - ☐ Endorsement only
11. Is this program offered at more than one site?
- ☐ Yes
 - ☒ No
12. If your answer is "yes" to above question, list the sites at which the program is offered
-
13. Title of the state license for which candidates are prepared, including science areas licensed to teach (i.e., Single Field - Biology; Dual Field - Biology and Chemistry; Broad Field; Integrated Science, etc.)
- Biology (7-12), Chemistry (7-12), Earth and Space Science (7-12), Physics (7-12), General Science (7-12)
14. Program report status:
- ☒ Initial Review
 - ☐ Response to One of the Following Decisions: Further Development Required or Recognition with Probation
 - ☐ Response to National Recognition With Conditions
15. Is your Educator Preparation Provider (EPP) seeking
- ☐ CAEP accreditation for the first time (initial accreditation)
 - ☒ Continuing CAEP accreditation
16. State Licensure data requirement on program completers disaggregated by specialty area with sub-area scores:
CAEP requires programs to provide completer performance data on state licensure examinations for completers who take the examination for the content field, if the state has a licensure testing requirement. Test information and data must be reported in Section IV. Does your state require such a test?
- ☒ Yes
 - ☐ No

SECTION I - CONTEXT

1. Provide the following contextual information:

Description of any state or institutional policies that may influence the application of NSTA standards. (Response limited to 4,000 characters.)

The Department of Secondary Education and the College of Education include the Science certification programs at Kutztown University of Pennsylvania. A local Board of Trustees governs Kutztown University, as it is one of the fourteen institutions in the State System of Higher Education and, at the state level, the State System's Board of Governors also governs the University.

The Pennsylvania Department of Education (PDE) certifies candidates to teach in Pennsylvania. Title 22, Chapters 49.2 and 354 of the Pennsylvania code grant statutory authority to the State Board of Education to govern professional educator programs. PDE's authority to promulgate the regulations is granted from the state board. Chapter 354 is the regulatory document for the design and structure of the professional educator preparation programs while Chapter 49 provides certification requirements.

All teacher candidates in the Commonwealth of Pennsylvania must achieve a cumulative 3.0 GPA, a C or better in three hours of English composition, 3 hours of English Literature, and 6 hours of mathematics. All teacher candidates must pass one of the Basic Skills Assessment Test Options (see attached), maintain a 3.0 GPA in the major and overall, complete all courses in the major with a minimum of "C," complete 190 hours of field observations prior to student teaching, and take and pass the Praxis II Subject Assessment examination. The clinical experience requirement is a minimum of 12 weeks. Teacher candidates submit criminal clearances, which include Act 34 Criminal History Report, the Act 151 Child Abuse History Report, Act 114 FBI Federal Criminal History Record (Fingerprinting), Act 24 Arrest and Conviction, Act 126 Mandated Child Abuse Reporter Training and the TB testing result when the teacher candidate enters the College of Education and again prior to the final clinical experience.

2. Description of the field and clinical experiences required for the program, including the number of hours for early field experiences and the number of hours/weeks for student teaching or internships. Describe setting of student teaching (i.e., student teaching occurs in a science classroom). (Response limited to 8,000 characters.)

Stage 1: Each candidate participates in an Education Exploration requiring 40 hours of field experience. The candidates receive information about the Exploration in the first education course that they take at the university. The experiences vary in terms of grade level, types of schools, and attention to diversity (see attached). By the time education majors have reached 48 credit hours, they must have documentation of completed field hours with reflection, as well as meeting Pennsylvania requirements of GPA, required courses, Praxis I, and criminal clearances to qualify as a teacher candidate thus being eligible for more intensive clinical experiences and upper level education courses. The Department of Secondary Education has adopted an electronic submission format.

Stage 2: The second level of clinical experience that teaching candidates participate in is a weekly assignment to a classroom in their content area. At this stage, teaching candidates take a six-credit course consisting of SEU 312: Principles of Learning and SEU 313: Principles of Learning Lab. There is a college classroom component and a lab component that takes place in a classroom in their certification area. For this 14-week placement, teaching candidates are assigned as a cohort group to an urban middle school. The professor teaching the course works with an urban principal to place the students appropriately. The teaching candidates spend 4-6 hours each week in the assigned classroom. Since the professor and teaching candidate share a common experience, it can be related to learning theory and discussed on a weekly basis. Candidates answer focused questions about the experience in their on-line journal. Candidates receive a minimum of 45 field hours in the urban middle level field experience. This is the middle level and urban experience. The third level of clinical experience the teaching candidates participate in is when they take SEU 342: Principles of Teaching and SEU 343: Principles of Teaching Lab. This six credit course is accompanied by a laboratory field experience in a suburban or rural high school in a classroom matching the teaching candidates' certification area. For this 14-week placement, teaching candidates are assigned as a cohort group to an urban middle school. The professor teaching the course works with a suburban or rural principal to place the candidates appropriately. The teaching candidates spend 4-6 hours each week in the assigned classroom. Since the professor and teaching candidate share a common experience, it can be related to learning theory and discussed on a weekly basis. Candidates receive a minimum of 45 field hours in the suburban or rural high school field experience. The fourth level of clinical experience is when the candidates take their specific methods class. The teaching candidates are required to complete 20 service hours with middle or high school students. The 20 service hours will be completed with their pre-approved cooperating teacher for their student teaching placement in the coming semester. This provides candidates a chance to meet the class and cooperating teachers they will be placed with during student teaching. The 20 hours with their cooperating teacher must be documented with their methods professor. Teaching candidates are also given the opportunity to reflect on their clinical experience and how it contributes to their understanding of how children learn and how to teach them by turning in a paper on their experience.

Stage 3: The capstone clinical experience at Kutztown University is the coordination of the twenty-hour Methods field placement and student teaching. Candidates return to the cooperating teacher and placement that they completed their fourth level of field experience at for 140 hours of student teaching (15-week placement). The university employs a cooperating teacher to oversee the teaching candidate experience and a university supervisor visits six times or more during the placement to ensure that the teacher candidate is performing appropriately. Science student teachers are placed in science

classrooms with cooperating teachers who are certified in the same content area as the candidate. During the clinical experience, a candidate meets for two hours each week with the cohort group in a practicum seminar with the university supervisor. The purpose of the practicum is to allow candidates to meet with other candidates and their university supervisor to provide the practical aspects of teaching. These practicum focus on candidates' experiences. It is a time for reflection and application. In addition, guest speakers address particular timely student teaching issues and concerns. Prior to being eligible for the Pennsylvania teaching certificate, Kutztown University teaching candidates will be required to complete 870 field hours.

3. A program of study that outlines the courses and experiences required for candidates to complete the program. The program of study must include course titles and numbers. (This information may be provided as an attachment from the college catalog or as a student advisement sheet.) Include forms showing requirements for science content courses for post degree or master's programs. Syllabi and course descriptions are not generally necessary. Please include directions for each level of candidate (e.g., undergraduate advising sheet and post degree or graduate advising sheet.) A course of study for post baccalaureate or master's programs should include required science content.

Biology Program of Study - Undergraduate	Chemistry Program of Study - Undergraduate
Earth and Space Science Program of Study - Undergraduate	Physics Program of Study - Undergraduate
General Science Program of Study - Undergraduate	

See Attachment panel below.

4. This system will not permit you to include tables or graphics in text fields. Therefore any tables or charts must be attached as files here. The title of the file should clearly indicate the content of the file. Word documents, pdf files, and other commonly used file formats are acceptable.

Basic Skills Assessment Options	Education Exploration Field Experiences
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See Attachment panel below.

5. Candidate Information
Directions: Provide three years of data on candidates enrolled in the program and completing the program, beginning with the most recent academic year for which numbers have been tabulated. Report the data separately for the levels/tracks (e.g., baccalaureate, post-baccalaureate, alternate routes, master's, doctorate) being addressed in this report. Report the data separately for each licensure area (e.g., chemistry, biology, broad field science, middle level). Data must also be reported separately for programs offered at multiple sites. Update academic years (column 1) as appropriate for your data span. Create additional tables as necessary.

Program: Biology (7-12) (Undergraduate Level)		
Academic Year	# of Candidates Enrolled in the Program	# of Program Completers ²
2013-2014	11	3
2014-2015	10	1
2015-2016	8	1

Program: Chemistry (7-12) (Undergraduate Level)		
Academic Year	# of Candidates Enrolled in the Program	# of Program Completers ²

2013-2014	1	0
2014-2015	6	1
2015-2016	4	0

Program: Earth and Space Science (7-12) (Undergraduate Level)		
Academic Year	# of Candidates Enrolled in the Program	# of Program Completers ²
2013-2014	1	1
2014-2015	0	0
2015-2016	1	0

Program: Physics (7-12) (Undergraduate Level)		
Academic Year	# of Candidates Enrolled in the Program	# of Program Completers ²
2013-2014	15	3
2014-2015	8	0
2015-2016	7	2

Program: General Science (7-12) (Undergraduate Level)		
Academic Year	# of Candidates Enrolled in the Program	# of Program Completers ²
2013-2014	3	0
2014-2015	5	3
2015-2016	2	1

(2) CAEP uses the Title II definition for program completers. Program completers are persons who have met all the requirements of a state-approved teacher preparation program. Program completers include all those who are documented as having met such requirements. Documentation may take the form of a degree, institutional certificate, program credential, transcript, or other written proof of having met the program's requirements.

6. Faculty Information

Directions: Complete the following information for each faculty member responsible for science education professional coursework, clinical supervision, or administration in this program. This may be the science educator(s) or others directly involved in teaching science education portion of the licensure program.

Faculty Member Name	Dr. George Sirrakos
Highest Degree, Field, & University ³	PhD in Education, Curtin University of Technology
Assignment: Indicate the role of the faculty member ⁴	Faculty
Faculty Rank ⁵	Assistant Professor
Tenure Track	<input checked="" type="checkbox"/> YES
Scholarship ⁶ , Leadership in	Published articles in Learning Environments: An International Journal and The Journal of Culture and Education. Awarded a grant to explore the use of

Professional Associations, and Service ⁷ :List up to 3 major contributions in the past 3 years ⁸	student produced audio-narratives to improve student attitudes toward science. Major program reviewer for the Pennsylvania Department of Education. Developed an academic minor in Integrative STEM Education at Kutztown University.
Teaching or other professional experience in P-12 schools ⁹	New York State Teacher Certification: Biology/General Science (7-12). High school science teacher for 7 years. Clinical supervisor for undergraduate student teachers seeking initial certification in science. Clinical supervision of fieldwork placement in SEU 313: Principles of Learning.

Faculty Member Name	Dr. Theresa M. Stahler
Highest Degree, Field, & University ³	PhD in Teacher Education, The Ohio State University
Assignment: Indicate the role of the faculty member ⁴	Chairperson of the Department of Secondary Education; Faculty
Faculty Rank ⁵	Professor
Tenure Track	<input checked="" type="checkbox"/> YES
Scholarship ⁶ , Leadership in Professional Associations, and Service ⁷ :List up to 3 major contributions in the past 3 years ⁸	Co-author of Doctoral Program in Transformational Teaching and Learning. Departmental representative on the university senate. Member of the College of Education Executive Committee and the Provost's Advisory Council
Teaching or other professional experience in P-12 schools ⁹	English Education Middle School Teaching Certificates in English 7-12, Middle Level Language Arts 6-8 and School Counseling K-12 Supervisor of student clinical experiences prior to student teaching

Faculty Member Name	Dr. Mark Wolfmeyer
Highest Degree, Field, & University ³	PhD in Urban Education, Graduate Center at the City University of New York (CUNY)
Assignment: Indicate the role of the faculty member ⁴	Faculty
Faculty Rank ⁵	Assistant Professor
Tenure Track	<input checked="" type="checkbox"/> YES
Scholarship ⁶ , Leadership in Professional Associations, and Service ⁷ :List up to 3 major contributions in the past 3 years ⁸	Book: Mathematics Education: A Critical Introduction (Routledge, 2017); Book: Philosophy of STEM Education: A Critical Investigation (Palgrave Macmillan, 2015); Reviewer: American Educational Research Association (AERA); Division K (Teacher Education) Paper Presentations Conference Reviewer; Kutztown University Service (e.g. Space Allocation Committee, KU Foundation Committee); KU College of Education Service (e.g. COE Assessment Committee); Professional Organization Service (e.g. Eastern Pennsylvania Council of Teachers of Mathematics Program Committee Member)
Teaching or other professional experience in P-12 schools ⁹	Clinical supervision of secondary mathematics education student teachers Clinical supervision of fieldwork placement in SEU 343: Principles of Teaching 10 years experience secondary Mathematics Teacher, public schools 7-12 Secondary Mathematics Certificate NJ, California

Faculty Member Name	Dr. Kunal Das
Highest Degree, Field, &	PhD in Theoretical Physics, Stony Brook University

University ³	
Assignment: Indicate the role of the faculty member ⁴	Faculty
Faculty Rank ⁵	Professor
Tenure Track	<input checked="" type="radio"/> YES
Scholarship ⁶ , Leadership in Professional Associations, and Service ⁷ : List up to 3 major contributions in the past 3 years ⁸	Over 30 publications in international peer-reviewed journals. Current research is supported by a grant from the National Science Foundation (NSF). Member of the American Physical Society (APS) and peer-reviewer of APS journals in physics.
Teaching or other professional experience in P-12 schools ⁹	N/A

Faculty Member Name	Dr. Darren Achey
Highest Degree, Field, & University ³	PhD in Chemistry, Johns Hopkins University
Assignment: Indicate the role of the faculty member ⁴	Faculty
Faculty Rank ⁵	Assistant Professor
Tenure Track	<input checked="" type="radio"/> YES
Scholarship ⁶ , Leadership in Professional Associations, and Service ⁷ : List up to 3 major contributions in the past 3 years ⁸	Created a new course titled Powering Our Future: Energy, Climate Change, and Society. Two recently published papers Excited state electron transfer from cobalt coordination compounds anchored to TiO ₂ E.C. Brigham, D. Achey, G.J. Meyer Polyhedron, 2014, 82, 181-190; DOI: 10.1016/j.poly.2014.07.023 Excited state electron transfer after visible light absorption by the Co(I) state of Vitamin B12 D. Achey, E.C. Brigham, B.N. DiMarco, G.J. Meyer Chem. Comm., 2014, 50 (87), 13304-13306; DOI: 10.1039/c4cc02221a
Teaching or other professional experience in P-12 schools ⁹	N/A

Faculty Member Name	Dr. Christopher Sacchi
Highest Degree, Field, & University ³	PhD in Biological Sciences (Ecology), Northern Arizona University
Assignment: Indicate the role of the faculty member ⁴	Faculty
Faculty Rank ⁵	Professor
Tenure Track	<input checked="" type="radio"/> YES
Scholarship ⁶ , Leadership in Professional Associations, and Service ⁷ : List up to 3 major contributions in the past 3 years ⁸	Sacchi, C.F. and W.L. Ryan. National Science Foundation Scholarships in Science, Technology, Engineering, and Math (S-STEM) Grant - March 2012 - May 2017 (\$596,000) Principal Investigator (CFS) - Co-PI is Dr. Wendy Ryan in the Department of Biology) - Provide need-based scholarships (up to \$7950 per student/year) to academically promising students in the interdisciplinary Environmental and Marine Science programs at Kutztown University PA Institute for Conservation Education (PICE) Wildlife Leadership Academy (WLA) - Instructor for PA Bucktails and PA Ursids five day

	residential camps - Also serve on PA Bucktails Advisory Committee 2007-Present
Teaching or other professional experience in P-12 schools ⁹	Has given presentations on Plant Science to Boy Scouts of America groups and to 9-12 graders at summer camps to promote Conservation Education.

Faculty Member Name	Dr. Gregory Setliff
Highest Degree, Field, & University ³	PhD in Entomology, University of Minnesota
Assignment: Indicate the role of the faculty member ⁴	Faculty
Faculty Rank ⁵	Associate Professor
Tenure Track	<input checked="" type="checkbox"/> YES
Scholarship ⁶ , Leadership in Professional Associations, and Service ⁷ : List up to 3 major contributions in the past 3 years ⁸	Two peer reviewed publications and eleven presentations in the last three years. President of the Entomological Society of Pennsylvania (November 2015-2016) Organized and moderated an international symposium on Spotted Lanternfly entitled, An invasive planthopper goes global: shedding light on the spotted lanternfly (<i>Lycorma delicatula</i>), for the XXV International Congress of Entomology. Orlando, FL, September 30, 2016
Teaching or other professional experience in P-12 schools ⁹	Operated a Distance Education School in Gulf Province, Papua New Guinea for two years as a U.S. Peace Corps Volunteer. Taught grades 6-11 Social Science, Earth Science, Commerce, and Life Science.

Faculty Member Name	Dr. Sudarshan Fernando
Highest Degree, Field, & University ³	PhD in Physics, Pennsylvania State University, University Park
Assignment: Indicate the role of the faculty member ⁴	Faculty
Faculty Rank ⁵	Associate Professor
Tenure Track	<input checked="" type="checkbox"/> YES
Scholarship ⁶ , Leadership in Professional Associations, and Service ⁷ : List up to 3 major contributions in the past 3 years ⁸	S. Fernando and M. Gunaydin, ``Massless conformal fields, AdS_{d+1}/CFT_d higher spin algebras and their deformations," Nucl. Phys. B 904, 494 (2016), arXiv:1511.02167 [hep-th]. S. Fernando and M. Gunaydin, ``Minimal unitary representation of 5d superconformal algebra $F(4)$ and AdS_6/CFT_5 higher spin (super)-algebras," Nucl. Phys. B 890, 570 (2014) arXiv:1409.2185 [hep-th].
Teaching or other professional experience in P-12 schools ⁹	N/A

(3) For example, PhD in Curriculum & Instruction, University of Nebraska.

(4) For example, faculty, clinical supervisor, department chair, administrator

(5) For example, professor, associate professor, assistant professor, adjunct professor, instructor

(6) Scholarship is defined by CAEP as a systematic inquiry into the areas related to teaching, learning, and the education of teachers and other school personnel.

Scholarship includes traditional research and publication as well as the rigorous and systematic study of pedagogy, and the application of current research findings in new settings. Scholarship further presupposes submission of one's work for professional review and evaluation.

(7) Service includes faculty contributions to college or university activities, schools, communities, and professional associations in ways that are consistent with the institution and unit's mission.

(8) For example, officer of a state or national association, article published in a specific journal, and an evaluation of a

local school program.

(9) Briefly describe the nature of recent experience in P-12 schools (e.g. clinical supervision, in-service training, teaching in a PDS) indicating the discipline and grade level of the assignment(s). List current P-12 licensure or certification (s) held, if any.

SECTION II - LIST OF ASSESSMENTS

1. In this section, list the 6-8 assessments that are being submitted as evidence for meeting the NSTA standards. All programs must provide all six assessments. If your state does not require a state licensure test in the content area, you must substitute an assessment that documents candidate attainment of content knowledge in #1 below. For each assessment, indicate the type or form of the assessment and when it is administered in the program.

Type and Number of Assessment	Name of Assessment (10)	Type or Form of Assessment (11)	When the Assessment Is Administered (12)
Assessment #1: Content Knowledge – Licensure Tests 13(required)	ETS Subject Assessment Results	Exam administered by Education Testing Service (ETS). This is the required state licensure test.	Multiple times throughout a calendar year. Time and place is determined by ETS.
Assessment #2: Content Knowledge – an assessment of general content knowledge in discipline to be taught, GPA and Content Analysis Form (required)	Grade Point Average (GPA)	Grade Point Average (GPA) from required courses identified on NSTA Content Analysis Form.	GPA is calculated when the candidate has completed the teacher preparation program.
Assessment #3: Pedagogical and Professional Knowledge and Skills– Planning instruction and assessment (required)	Unit Plan	Written assignment. Comprehensive unit plan consisting of five sections: unit overview, big ideas, assessment, personalization of the learning experience, and lesson plans	Required course: Science Instructional Methods course (SEU 410). Typically, candidates take this course the semester before their student teaching experience.
Assessment #4: Pedagogical and Professional Knowledge and Skills– Student Teaching Assessment with Legal/Safety/Ethical Issues (required)	Safety Addendum to Student Teaching Observation Form (PDE 430)	Lesson plans and observations during student teaching	Observations are conducted a minimum of six times throughout a 15-week student teaching placement. Final evaluation occurs at the conclusion of the candidate's student teaching experience.
Assessment #5: Effects on Student Learning (required)	Evidence of P-12 Student Learning: Teacher Work Sample	Written assignment. Action research involving the collection of pretest and posttest data and candidate reflection.	Midway through the candidate's student teaching experience.

Assessment #6: Pedagogical and Professional Knowledge and Skills (required)	Professional Knowledge and Skills	Written assignment. Collection of reflective papers	End of the candidate's student teaching experience.
Assessment #7: Optional	Professional Exit Portfolio	Digital Portfolio consisting of multiple artifacts (ex. lesson plans, unit plans, management plans, assessments, etc.).	End of the candidate's student teaching experience.
Assessment #8: Optional			

(10) Identify assessment by title used in the program; refer to Section IV for further information on appropriate assessment to include.

(11) Identify the type of assessment (e.g., essay, case study, project, comprehensive exam, reflection, state licensure test, portfolio).

(12) Indicate the point in the program when the assessment is administered (e.g., admission to the program, admission to student teaching/internship, required courses [specify course title and numbers], or completion of the program).

(13) If licensure test data are submitted as Assessment #1, the assessment and scoring guide attachments are not required. If the state does not require a licensure test, another content based assessment must be submitted (including the assessment and scoring guide).

SECTION III - RELATIONSHIP OF ASSESSMENT TO STANDARDS

For each NSTA standard on the chart below, identify the assessment(s) in Section II that address the standard. One assessment may apply to multiple NSTA standards.

1. NSTA Standard 1

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.

#1 #2 #3 #4 #5 #6 #7 #8

Preservice teachers will:

1a) Understand the major concepts, principles, theories, laws, and interrelationships of their fields of licensure and supporting fields as recommended by the National Science Teachers Association.

1b) Understand the central concepts of the supporting disciplines and the supporting role of science-specific technology.

1c) Show an understanding of state and national curriculum standards and their impact on the content knowledge necessary for teaching P-12 students.

<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

2. NSTA Standard 2

Effective teachers of science understand how students learn and develop scientific knowledge. Preservice teachers use scientific inquiry to develop this knowledge for all students.

#1 #2 #3 #4 #5 #6 #7 #8

Preservice teachers will:

2a) Plan multiple lessons using a variety of inquiry approaches that demonstrate their knowledge and understanding of how all students learn science.

2b) Include active inquiry lessons where students collect and interpret data in order to develop and communicate concepts and understand scientific processes, relationships and natural patterns from empirical experiences. Applications of science-specific technology are included in the lessons when appropriate.

2c) Design instruction and assessment strategies that confront and address naïve concepts/preconceptions.

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

3. NSTA Standard 3

Effective teachers of science are able to plan for engaging all 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 science-specific technology, to achieve those goals; and they plan fair and equitable assessment strategies to evaluate if the

learning goals are met.

	#1	#2	#3	#4	#5	#6	#7	#8
Preservice teachers will design a Unit of Study that:								
3a) Use a variety of strategies that demonstrate the candidates' knowledge and understanding of how to select the appropriate teaching and learning activities – including laboratory or field settings and applicable instruments and/or technology- to allow access so that all students learn. These strategies are inclusive and motivating for all students.								
3b) Develop lesson plans that include active inquiry lessons where students collect and interpret data using applicable science-specific technology in order to develop concepts, understand scientific processes, relationships and natural patterns from empirical experiences. These plans provide for equitable achievement of science literacy for all students.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3c) Plan fair and equitable assessment strategies to analyze student learning and to evaluate if the learning goals are met. Assessment strategies are designed to continuously evaluate preconceptions and ideas that students hold and the understandings that students have formulated.								
3d) Plan a learning environment and learning experiences for all students that demonstrate chemical safety, safety procedures, and the ethical treatment of living organisms within their licensure area.								

4. NSTA Standard 4

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.

	#1	#2	#3	#4	#5	#6	#7	#8
Preservice teachers will:								
4a) Design activities in a P-12 classroom that demonstrate the safe and proper techniques for the preparation, storage, dispensing, supervision, and disposal of all materials used within their subject area science instruction.								
4b) Design and demonstrate activities in a P-12 classroom that demonstrate an ability to implement emergency procedures and the maintenance of								

safety equipment, policies and procedures that comply with established state and/or national guidelines. Candidates ensure safe science activities appropriate for the abilities of all students.

4c) Design and demonstrate activities in a P-12 classroom that demonstrate ethical decision-making with respect to the treatment of all living organisms in and out of the classroom. They emphasize safe, humane, and ethical treatment of animals and comply with the legal restrictions on the collection, keeping, and use of living organisms.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. NSTA Standard 5

Effective teachers of science provide evidence to show that 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. Candidates provide evidence for the diversity of students they teach.

#1 #2 #3 #4 #5 #6 #7 #8

Preservice teachers will:

5a) Collect, organize, analyze, and reflect on diagnostic, formative and summative evidence of a change in mental functioning demonstrating that scientific knowledge is gained and/or corrected.

5b) Provide data to show that P-12 students are able to distinguish science from nonscience, understand the evolution and practice of science as a human endeavor, and critically analyze assertions made in the name of science.

5c) Engage students in developmentally appropriate inquiries that require them to develop concepts and relationships from their observations, data, and inferences in a scientific manner.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. NSTA Standard 6

Effective teachers of science strive continuously to improve their knowledge and understanding of the ever changing knowledge base of both content, and science pedagogy, including approaches for addressing inequities and inclusion for all students in science. They identify with and conduct themselves as part of the science education community.

#1 #2 #3 #4 #5 #6 #7 #8

Preservice teachers will:

6a) Engage in professional development opportunities in their content field such as talks, symposiums, research opportunities, or projects within their community.

6b) Engage in professional development opportunities such as conferences, research opportunities, or projects within their community.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

SECTION IV - EVIDENCE FOR MEETING STANDARDS

DIRECTIONS: The 6-8 key assessments listed in Section II must be documented and discussed in Section IV. Taken as a whole, the assessments must demonstrate candidate mastery of the SPA standards. The key assessments and data reported should be required of all candidates. Assessments, scoring guides/rubrics and data charts should be aligned with the SPA standards. This means that the concepts in the SPA standards should be apparent in the assessments and in the scoring guides to the same depth, breadth, and specificity as in the SPA standards. Data tables should also be aligned with the SPA standards. The data should be presented as they are collected. For example, if a rubric collects data on 10 elements [each relating to specific SPA standard(s)], then the data chart should report the data on each of the elements and NSTA standards.

In the description of each assessment below, the SPA has identified potential assessments that would be appropriate. Assessments have been organized into the following three areas to be aligned with the elements in CAEP Standard 1:

- Content knowledge (Assessments 1 and 2)
- Pedagogical and professional knowledge and skills (Assessments 3, 4, and 6)
- Focus on student learning (Assessment 5)

Note that in some disciplines, content knowledge may include or be inextricable from professional knowledge. If this is the case, assessments that combine content and professional knowledge may be considered "content knowledge" assessments for the purpose of this report.

For each assessment, the compiler should prepare one document that includes the following items:

(1) A two-page narrative that includes the following:

- a. A brief description of the assessment and its use in the program (one sentence may be sufficient);
 - b. A description of how this assessment specifically aligns with the elements and standards it is cited for in Section III. Cite SPA standards by number, title, and/or standard wording.
 - c. A brief analysis of the data findings;
 - d. An interpretation of how that data provides evidence for meeting standards, indicating the specific SPA standards by number, title, and/or standard wording;
- and

(2) Assessment Documentation

- e. The assessment tool itself or a rich description of the assessment (often the directions given to candidates);
- f. The scoring guide/rubrics for the assessment; and
- g. Charts that provide candidate data derived from the assessment.

The responses for e, f, and g (above) should be limited to the equivalent of five text pages each, however in some cases assessment instruments or scoring guides/rubrics may go beyond five pages.

Note: As much as possible, combine all of the files for one assessment into a single file. That is, create one file for Assessment 4 that includes the two-page narrative (items a – d above), the assessment itself (item e above), the scoring guide (item f above), and the data chart (item g

above). Each attachment should be no larger than 2 mb. Do not include candidate work or syllabi. There is a limit of 20 attachments for the entire report so it is crucial that you combine files as much as possible.

1. CONTENT KNOWLEDGE: Data from licensure tests of content knowledge in science education. If your state does not require licensure tests in the content area, data from another assessment must be presented to document candidate attainment of content knowledge. The NSTA standard that must be addressed by this assessment includes, but is not limited to, Standard 1a.

Provide assessment information as outlined in the directions for Section IV

1. The names of all licensure tests or professional examinations required by the state for content and pedagogical or professional knowledge¹⁵.

2. Description of the alignment between licensure test data and applicable NSTA standards. However, if the test is a science content Praxis II test, the alignment is not required (e.g., Praxis II 20235: Biology Content).

3. Aggregated pass rates for each year over the past 3 years, including the most recent academic year. Data must be presented on all completers, even if there were fewer than 10 test takers during a single year. Eighty percent of program completers¹⁶ who have taken the content test must pass the applicable state licensure test if the state has such a test.

4. The mean and range of sub-scores for the most recent academic year.

5. A single attachment of assessment documentation, including :

(a) the assessment tool or description of the assignment;

(b) the scoring guide for the assessment; and

(c) candidate data derived from the assessment.

Data should be in aggregate form (not scores for each candidate) and disaggregated by licensure area (biology, chemistry, middle school, etc) and by program (undergraduate, post degree, masters of teaching).

(d) reflections on any rubric changes and why those changes occurred may be included here.

The narrative section for each assessment (1-5 above) is limited to two text pages. If the attachment exceeds the 2mg file size limit by CAEP, break the attachment into logical parts.

NSTA Assessment 1.docx

See Attachment panel below.

(15) For example, Praxis II Biology: Content Knowledge.

(16) CAEP uses the Title II definition for program completers. Program completers are persons who have met all the requirements of a state-approved teacher preparation program. Program completers include all those who are documented as having met such requirements. Documentation may take the form of a degree, institutional certificate, program credential, transcript, or other written proof of having met the program's requirements.

2. CONTENT KNOWLEDGE: An assessment that demonstrates candidate knowledge of the conceptual science to be taught and related fields. An assessment that demonstrates that candidates are well prepared in the breadth of knowledge needed to teach in their fields of licensure. The NSTA standard that must be addressed by this assessment includes, but is not limited to, Standard 1.

Assessments could include content grade point averages and minimum grade requirements, portfolio requirements, or comprehensive examinations suitable for preparing teachers of a curriculum based on the content recommendations in the 2012 NSTA Standards 1a-b.

Provide assessment information as outlined in the directions for Section IV in a single attachment

NOTE: In addition to the above all programs must submit the appropriate NSTA Content Analysis Form. These are available at the following URL: <http://caepnet.org/accreditation/caep-accreditation/spa-standards-and-report-forms/nsta>. Download the appropriate form, fill it out, and attach it here.

NSTA Content Analysis Form	NSTA Assessment 2
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See Attachment panel below.

3. PEDAGOGICAL AND PROFESSIONAL KNOWLEDGE AND SKILLS: An assessment that demonstrates candidates can plan effective classroom-based instruction, and design assessments, consistent with goals of the National

Science Education Standards. NSTA standards that must be addressed by this assessment include, but are not limited to, Standard 1.

A minimum indicator should include performance in the design of at least one major demonstration teaching unit (not a single lesson plan) aligned with goals as reflected in breadth of 2012 NSTA Standards 1c, 2a-c, and 3a-d (with lesson plans and varied assessments).

Provide assessment information as outlined in the directions for Section IV in a single attachment

NSTA Assessment 3

See Attachment panel below.

4. PEDAGOGICAL AND PROFESSIONAL KNOWLEDGE AND SKILLS: Assessment that demonstrates candidates' knowledge and skills are applied effectively in practice. NSTA standards that must be addressed by this assessment include, but are not limited to, Standard 4. The assessment instrument used in student teaching and the internship should be submitted.

An indicator could include performances on a subset of items from a student teaching observation form with each area of safety addressed explicitly: 4a- Chemical use and storage, 4b – Safety procedures, 4c –Use and care of animals.

An indicator could include performance in an internship that is evaluated using an observation form filled out by the cooperating teacher and supervisor.

Provide assessment information as outlined in the directions for Section IV in a single attachment

PDE 430 Observation Form	NSTA Assessment 4
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See Attachment panel below.

5. EFFECTS ON STUDENT LEARNING: An assessment that demonstrates candidate effects on student learning using evidence collected from the instruction and assessment of students; the nature of science; the practice of inquiry (including student engagement in inquiry). NSTA standard that must be addressed by this assessment include, but is not limited to, Standard 5.

A minimum indicator should include an assessment of candidate work aligned with NSTA Standard 5. Work samples may include pre and post test data with analysis and reflections.

Provide assessment information as outlined in the directions for Section IV in a single attachment

NSTA Assessment 5

See Attachment panel below.

6. PEDAGOGICAL AND PROFESSIONAL KNOWLEDGE AND SKILLS: An assessment that demonstrates candidates are prepared to be active members in their profession. The NSTA standard addressed by this assessment includes, but is not limited to, Standard 6.

Provide assessment information as outlined in the directions for Section IV

NSTA Assessment 6

See Attachment panel below.

7. Additional assessment that addresses NSTA standards.

Provide assessment information as outlined in the directions for Section IV

NSTA Assessment 7

See Attachment panel below.

8. Additional assessment that addresses NSTA standards.

Provide assessment information as outlined in the directions for Section IV

SECTION V - USE OF ASSESSMENT RESULTS TO IMPROVE PROGRAM

1. Evidence must be presented in this section that assessment results have been analyzed and have been or will be used to improve candidate performance and strengthen the program. This description should not link improvements to individual assessments but, rather, it should summarize principal findings from the evidence, the faculty's interpretation of those findings, and changes made in (or planned for) the program as a result. Describe the steps program faculty has taken to use information from assessments for improvement of both candidate performance and the program. This information should be organized around (1) science content knowledge, (2) professional and pedagogical knowledge and skill, and (3) student learning.

(Response limited to 12,000 characters)

The Department of Secondary Education is committed to providing our science education candidates with the necessary knowledge and skills to become effective teachers of science. It is from this perspective that we develop our assessments, analyze candidate data, reflect on our programs, and make changes and improvements to programs. The data collected from Assessments 1-7 provide ample evidence that candidates in the Secondary Education Science programs are attaining required content knowledge, professional and pedagogical knowledge and skills, and are having a positive impact on student learning. While there is much to be proud of in our science education programs, there are also a number of enacted and proposed changes in how we prepare our science teachers.

Science Content Knowledge:

Teacher candidates in the Secondary Education Science programs possess strength in their content knowledge as demonstrated by Assessments 1 and 2. First, the effective pass rate on the Praxis II for the past three years was 100% with a strong showing of Praxis II scores by licensure area. Second, the completed NSTA Content Analysis Form shows an alignment of greater than 90% between coursework required in the secondary education science programs and content competencies specified by NSTA. Finally, the majority of candidates included in this report completed their program with core content and supporting content GPAs above a 3.0, or a B. Combined, these data indicate that the candidates' respective science program adequately and appropriately supports them in acquiring and retaining content knowledge. While GPA data show a slight decrease in the undergraduate aggregated GPA over the last three academic years, the sample size is not large enough to claim that this decrease is any cause for alarm. Data derived from these assessments are routinely discussed and analyzed by science education faculty in the College of Education and science faculty in the College of Liberal Arts and Sciences to facilitate candidate success. For example, faculty collaborate to ensure alignment between content categories of the ETS Subject Assessment exams and the content courses required of secondary science education candidates.

In the past, a very small number of candidates were able to graduate with a grade of D in a required course. However, most candidates who received a grade lower than a C in a required course took advantage of the university's course retake feature. This allows candidates to retake a course and replace

their original grade with the newer grade. A student-by-student transcript analysis revealed that most candidates performed well on their coursework, achieving a grade of C or higher, the first time around. However, two candidates did complete the program with a grade of D on one of the required core content courses. While a policy exists stating that candidates must earn a C or higher on required core content courses, this has been loosely enforced, prompting the Department of Secondary Education to revisit the policy and explore ways to better enforce it. It is the department's intention to have an updated policy in place by the beginning of the Fall 2017 semester.

One initiative is currently underway to improve first-time pass rates for ETS Subject Assessment exams across all content areas. The former Interim Associate Dean for the College of Education was awarded an assessment grant in August 2016. One of the intended products of the grant is the creation of online modules where undergraduate students can access Subject Assessment preparation materials, review aligned content, and engage with content-aligned interactive quizzes. These are currently under development and should be ready for student use by August 2017.

Professional and Pedagogical Knowledge and Skills:

Teacher candidates in the Secondary Education Science program demonstrate great competence regarding professional and pedagogical knowledge and skills. This assertion is substantiated by data collected through administration of the unit plan assessment, the professional and pedagogical skills assessment, observations of the candidate during student teaching, and completion of the professional exit portfolio. The unit plan assessment indicates strong competence with regard to a candidate's ability to identify relevant state content, common core math, and common core literacy standards and plan active inquiry lessons and assessments to facilitate and evaluate student learning. The professional and pedagogical skills assessment revealed that candidates engaged in a wide variety of professional development activities, focused equally on learning more about science content and science pedagogy. Data collected from observations during student teaching provide evidence that candidates can plan for, demonstrate, and maintain a safe learning environment. Given the heightened focus on safety in the science classroom, candidates are provided with explicit instruction regarding safety during the Science Instructional Methods course. Candidates are also required to complete a series of laboratory safety training modules prior to student teaching. The education faculty are content with candidates' understanding and demonstration of safety procedures and, thus, will continue to instruct and expose candidates to issues of safety in the science classroom using the current model. The professional exit portfolio provided candidates with an additional opportunity to demonstrate their competence across several of the NSTA standards. For most candidates, levels of competence were consistent between the professional exit portfolio and the required NSTA assessments. The consistency confirms areas where candidates excel as well as areas that require attention.

Candidates acquire professional and pedagogical knowledge and skills throughout their program. In 2006, the Department of Secondary Education responded to several state mandates by embedding literacy in higher-level education coursework and requiring candidates to take a minimum of two special education courses and one instructional technologies course. The candidates presented in this report represent a group of students who completed the newest state requirements. Beginning with Fall 2014, the first education course that students take (EDU 100: Foundations of American Education) was reorganized. Instead of a single section of the course with approximately 100 students, the course was broken into three sections, each with about 30 students. Students were then organized into each section by content area. For example, all of the mathematics and science education students were grouped into a single section of EDU 100. This new model allows the professor to tailor the course content to meet the specific needs of future mathematics and science educators. Next, the department's clinical model is flourishing with candidates spending a significant amount of time in classrooms prior to student teaching. Specifically, science candidates spend a minimum of 45 hours during the Principles of Learning Clinical Lab (SEU 313), a minimum of 45 hours during the Principles of Teaching Clinical Lab (SEU 343), and a minimum of 20 hours during the Science Instructional Methods (SEU 410) course in science classrooms. Throughout these hours, candidates are expected to assist teachers and students and function like teacher aides. Candidates report that these clinical experiences aid them in acquiring pedagogical and content knowledge. In addition, the Pennsylvania Department of Education has created the Standards Aligned System (SAS), a comprehensive, research-based website portal that aims to improve student achievement. SAS identifies six elements that impact student achievement: Standards, Assessments, Curriculum Framework, Instruction, Materials & Resources, and Safe and Supportive Schools. This portal is an integral part of the secondary education program and it is embedded in all of the secondary education courses.

One thing to note is that the instructor who teaches the Science Instructional Methods course is the same instructor who supervises candidates during their student teaching experience. Besides providing continuity for candidates, this is important to note because the instructor is able to identify areas for improvement that emerge from the unit plan assessment and use those to drive conversations with candidates during student teaching. Candidates are also required to become members of NSTA during their Science Instructional Methods course. The instructor uses several of the resources from the website and students use the NSTA website as one of their primary resources for acquiring professional and pedagogical knowledge and skills.

Assessment data revealed NSTA Standards 2c (confronting and addressing naïve concepts and preconceptions) and 3b (developing empirical experiences for students to construct science knowledge) as areas for improvement. The lower scores on these two dimensions suggest that they must be given greater

emphasis during the Science Instructional Methods course. To assist students in reaching higher levels of competency in these areas, the instructor will begin requiring students to submit drafts of their unit plan prior to the due date. This iterative process will allow the instructor to provide targeted feedback with respect to these two areas. Further, an additional course assignment where candidates develop an empirical experience consistent with the requirements of NSTA Standard 3b has already been developed and will be used for the first time during the Fall 2017 semester. A program improvement stemming from Assessment 6 has also been identified. Moving forward, to ensure consistent and ongoing professional development in content and pedagogy, candidates will be made aware of the requirements of Assessment 6 at the beginning of their junior year. Candidates will be required to report on their progress throughout the final two years of their program. This will occur during mandatory once-a-semester advising sessions between the candidate and the science education advisor. These advising sessions will also serve as checkpoints in case remediation is necessary.

Student Learning:

Candidates did a great job in providing students with engaging inquiry opportunities as well as collecting assessment data and reflecting upon that data to make relevant changes to their instruction. The Teacher Work Sample has become an important element of all secondary education programs. The task has been modified several times since it was first introduced around 2011/2012. The assessment has been moved to the candidates' student teaching experience, which provides a more substantive experience and an increased quantity of information to demonstrate impact on student learning.

Instructing candidates on how to assist their students in distinguishing science from nonscience, understanding the evolution and practice of science as a human endeavor, and critically analyzing assertions made in the name of science has been marked as an area for program improvement. A review of the Science Instructional Methods syllabus and the BIO 104 syllabus, which all science education majors are required to take, revealed that these issues are not greatly focused on. This helps to explain why candidates did not perform well on that aspect of NSTA Standard 5. Because it is unlikely that science faculty will adjust the contents of BIO 104, more opportunities for candidates to develop this skill will be provided during their methods course and fostered throughout student teaching. Further, the student teaching supervisor will ask cooperating teachers to work more closely with candidates regarding this aspect. Thus, candidates will have increased exposure to this element of NSTA Standard 5 and thus boost their ability to impact student learning.

SECTION VI - FOR REVISED REPORTS OR RESPONSE TO CONDITIONS REPORTS ONLY

1. For Revised Reports: Describe what changes or additions have been made to address the standards that were not met in the original submission. Provide new responses to questions and/or new documents to verify the changes described in this section. Specific instructions for preparing a Revised Report are available on the CAEP website at: <http://caepnet.org/accreditation/caep-accreditation/spa-program-review-policies-and-procedur>

For Response to Conditions Reports: Describe what changes or additions have been made to address the conditions cited in the original recognition report. Provide new responses to questions and/or new documents to verify the changes described in this section. Specific instructions for preparing a Response to Conditions Report are available on the CAEP website at: <http://caepnet.org/accreditation/caep-accreditation/spa-program-review-policies-and-procedur>

(Response limited to 24,000 characters.)

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Please click "Next"

This is the end of the report. Please click "Next" to proceed.