NSTA Program Report
Writing to improve your program

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Objectives

- See the relationship between NSTA 2003 Standards and the NCATE Assessment System
- Understand the NSTA-specific items that make this report science-specific
- Discuss exemplar assessments

NCATE Assessments

- Maximum of 8 assessments
- Numbers 1 through 5 are the same for all SPA's
- Assessments fall into 3 categories
  - Content
  - Pedagogy
  - K-12 Student Learning

Things to keep in mind for scoring guides

- Do the criteria adequately cover the important *defining elements* of the desired performance?
- Do the criteria *distinguish* the different levels of performance in observable ways?
- Are the variables in the criteria likely to be *interpreted* in the same way by different evaluators?
- Is there enough *substance* to the assessment to assure external reviewers that if the criteria are met, the candidate is prepared to teach to the standards?

Minimum NSTA/NCATE Alignment

Standards		1	2	3	4	5	6	7	8
1. Sc. content	Concepts & Principles								
	Unifying Concepts								
	Technology in Sc.								
	Research in science								
	Math in science								
2. Nature of Science									
3. Inquiry									
4. Issues in Science									
6. Curriculum									
7. Science in the Community									
8. Assessment									
9. Safety & Welfare									

1 Content: Praxis II Test

Standards		1	2	3	4	5	6	7	8
1. Sc. content	Concepts & Principles								
	Unifying Concepts								
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1 Content: Praxis II

- Must include all completers for the previous 2 years
- 80% pass rate applies if more than 10 total candidates (all science content tests for all 2 years)
- Data should include
  - Mean scores
  - Range scores
  - Pass rates for state
  - Sub-scores
- Do not need to show content alignment if Praxis II

Praxis required score = 148	**Yr 1**	**Score / %**	**Range**	**Yr 2**	**Score / %**	**Range**	**Yr 3**	**Score / %**	**Range**
Biology Content Knowledge	4	179	178-180	3	169	178-180	5	179	178-180
Basic Principles of Sc.	4	100%	100%	3	100%	100%	5	100%	100%
Molecular & Cellular Bio.	4	84%	82-86%	3	82%	82-86%	5	84%	82-86%
Genetics & Evolution	4	72%	61-83%	3	98%	95-98%	5	95%	91-96%
Div. life, plants, & animals	4	73%	61-82%	3	73%	61-82%	5	73%	61-82%
Ecology	4	42%	28-63%	3	42%	28-63%	5	42%	28-63%
STS	4	85%	73-100%	3	86%	73-100%	5	86%	73-100%

Assessment 1 Content: Praxis II Items to Consider

- Are the data available?
- How will you get the data?
- Do you have 10 completers in years? If not, then do not have to meet 80%. Still have to show disaggregated data by program, level, and subscores.

Reflections on data

- Upon examination of the data, we were able to learn and improve our program. For example, the year that we dropped Evolutionary Biology from our required coursework, the subscores in that area dropped dramatically. We re-evaluated our program and brought the course back into the requirements.

2 Content: Science Content Alignment

NSTA 2003 Standards		1	2	3	4	5	6	7	8
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2: GPA and Science Content

- Grade distributions or GPAs must be disaggregated by
  - licensure areas of the candidates (i.e., biology, general science, etc)
  - distinct levels of licensure (middle level, high school, secondary, etc
  - degree levels of preparation (undergraduate/postbaccalaureate/ masters)
- Provide aggregated data from all *science* courses taken by candidates in the program.
- Include science content alignment with the 2003 NSTA Standards using the Content Analysis Forms

GPA and Science Content

07-08	GPA		# Credits	
	Ave	Range	Ave	Range
Bio	3.59	2.25-3.90	42.33	30-53
Chem	2.95	2.13-3.68	33.67	34-41
Geol	4.00	4.00	15.83	14-18
Phys	3.33	2.33-3.93	15.00	15
#	Students in Broad Field 6			

2: Content Analysis Forms

- Available on the NCATE website
- Align the science content with the NSTA 2003 Standards
- Must demonstrate a 90% alignment

Table A: Earth/space

A. Core Competencies	B. Required course number & name and advising requirements
1. Energy flow and transformation in Earth systems	Geol 250 Physical Geology or equivalent
2. Characteristics of land, atmosphere & ocean systems on Earth	Geol 250 Physical Geology or equivalent

3 Pedagogy: Unit Plan

NSTA 2003 Standards		1	2	3	4	5	6	7	8
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3 Pedagogy: Unit Plan

- At least one major teaching unit
  - (not just a single lesson plan) includes requirements for activities with lesson plans and various assessments. The unit must include:
    - Unifying concepts
    - Nature of science
    - Inquiry
    - Issues
    - Personal and technological applications
    - State and national (NSES) science standards
    - Assessment
- Must be SCIENCE specific and meet all NSTA elements.

3 Pedagogy: Unit Plan

- How does this assessment fit into the what the rest of the department is doing?
- Can you build on a Unit Plan assessment that is already a part of the program?
- Are the scoring guides presently used at your institution specific to the 2003 NSTA standards?

4 Pedagogy: Student Teaching Form

NSTA 2003 Standards		1	2	3	4	5	6	7	8
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4 Pedagogy: Student Teaching Observation Form

- Addendum to regular form
- Include science specific areas or elements
  - Safety and all of its elements should be minimally scored

4 Pedagogy: Example A

Standard	Likert
9b. The candidate practices safe and proper techniques for the preparation, storage, dispensing, supervision, and disposal of all materials used in science instruction.	1 2 3 4 5

1 does not address standard
2 addresses but does not meet standard
3 meets standard at acceptable level
4 above minimum acceptable level
5 exceeds standard

Scoring guide needs improvement:
Discrimination of levels not science specific.
The criteria do not differentiate different levels of performance in observable ways.

4 Pedagogy: Example B

	Unacceptable	Acceptable	Target
Safe techniques (NSTA 9b)	The intern fails to practice safe and proper techniques for the preparation, storage, dispensing, supervision, and disposal of all materials used in science instruction.	The intern practices safe and proper techniques for the preparation, storage, dispensing, supervision, and disposal of all materials used in science instruction.	The intern practices safe and proper techniques for the preparation, storage, dispensing, supervision, and disposal of all materials used in science instruction without additional prompting from mentor or university supervisor.

Candidate are rated using the following guidelines:

Unacceptable:	The candidate's performance is not improving and is not acceptable
Acceptable:	The candidate's performance meets the expectations for pre-service teachers
Target:	The candidate's performance meets expectations that would be characteristic of an experienced teacher

Scoring guide needs improvement:
Criteria using operational terms are needed.

5: Evidence of K-12 Student Learning

NSTA 2003 Standards		1	2	3	4	5	6	7	8
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5: Evidence of K-12 Student Learning

The most important component of the NSTA program report

- Must be science specific and address each applicable NSTA standard and element
- Must have descriptors that are measurable

2c. The candidate facilitates students learning the nature of science	Provides little to no evidence of student learning beyond memorization of at least one aspect of the nature of science.	Provides evidence of student learning beyond memorization of at least one aspect of the nature of science. Representative sample of student work included.	Provides evidence of student learning beyond memorization of two or more aspects of the nature of science and representative samples of student work. Includes a reflective analysis of students' learning.

6 Content: Safety and Welfare

NSTA 2003 Standards		1	2	3	4	5	6	7	8
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6 Content: Safety Examples

- Webquest for safety content knowledge
- Safety test aligned with elements 9a-d
- Safety scavenger hunt in a classroom
- Safety checklist to determine safety in a classroom
- Case studies

- All of these can be used as long as the elements are all met with a scoring guide or rubric that is aligned with all elements.

7 Content: Research in Science Discipline

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7 Content: Research in Science Discipline

- Usually performed in the science content courses
- A system for post degree or transfer candidates
  - Alternative course or
  - Evaluation of previous work
- Action Research or science fair is not acceptable
  - What would your science departments deem acceptable?
  - Could be a short project

Example Scoring Guide

Investigation parts	Not acceptable (1)	Acceptable (2)	Excellent (3)
D. Data collection and organization (NSTA 1d)	Data is collected in a manner that is inconsistent with the science discipline. Data is poorly organized and/or displayed.	Data is collected consistent with the science discipline. Data is organized and presented using graphs, charts or tables with minor errors.	Data is collected consistent with the science discipline. Data is organized, clearly addresses research problem and presented with no errors.
F. Analysis and interpretation of data (NSTA 1d, 1e)	Inappropriate techniques used in data analysis and interpretation.	Appropriate techniques used in data analysis and interpretation with minor errors.	Appropriate techniques are used in data analysis and interpretation is clear and concise with no errors.
G. Final conclusions (NSTA 1d)	Conclusions not clearly related to problem or supported by data	Conclusions generally related to problem and supported by data	Conclusions clearly related to problem and fully supported by data

No part of this project should receive less than a "**2**" or it should be redone to the satisfaction of the instructor.

8 Content: Contextual Content

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8 Content: Contextual Content

- Content understanding of topics important to science educators
- Assessment #8 is usually addressed with a portfolio of appropriate assignments
- If there are courses that help to meet this standard, there needs to be specific descriptions to tie the course directly back to the 2003 NSTA standards

Review: Things to keep in mind for scoring guides

- Do the criteria adequately cover the important *defining elements* of the desired performance?
- Do the criteria *distinguish* the different levels of performance in observable ways?
- Are the variables in the criteria likely to be *interpreted* in the same way by different evaluators?
- Is there enough *substance* to the assessment to assure external reviewers that if the criteria are met, the candidate is prepared to teach to the standards?