A Tool to Develop Science Pre-service Teachers

Al Byers and Flavio Mendez, NSTA
Kate Baird, Indiana University-Purdue University Columbus
Susan Blunck, University of Maryland Baltimore County
Carolyn Mohr, Dominican University
Michael Odell, University of Texas at Tyler
Kathy Sparrow, Florida International University
William Veal, College of Charleston

Association for Science Teacher Education
San Antonio, Texas, January17, 2014
Agenda

• Introductions
• NLC Highlights
• Using NLC as e-Textbook
• NLC Tools, Resources, and Community
• Panel Discussion
• NLC Exploration
• Survey
Introducing today’s presenters:

- Al Byers and Flavio Mendez, NSTA
- Kate Baird, Indiana University-Purdue University Columbus
- Susan Blunck, University of Maryland Baltimore County
- Carolyn Mohr, Dominican University
- Michael Odell, University of Texas at Tyler
- Kathy Sparrow, Florida International University
- William Veal, College of Charleston
Institutions represented (28):

University of Georgia, Texas Tech University, Appalachian State University, University of Wisconsin La Crosse, Bio-Med Science Academy, University of Arizona, University of North Texas, Baylor University, New Jersey City University, University of Portland, Columbia University, University of Illinois at Urbana – Champaign, Utah State University, University of Minnesota, University of Louisville, Winston-Salem State University, Thomas More College, Purdue University, Illinois State University, Willamette University, University of South Florida, Marshall University, University of South Carolina, University of Florida, Saint John's University, University of Missouri, Princess Nora University, and Linköping University.
The NSTA Learning Center

Highlights

http://learningcenter.nsta.org
A Critical Piece of the Teacher Learning Solution

• Self-Directed Access

• 11,200+ resources

• Free tools to help teachers diagnose, organize, personalize, and document their learning

• Immediate free access to online advisors and colleagues through chat and discussion

• Badge recognition system

http://learningcenter.nsta.org
141,964 Active Users*

- 30,542 Members (21.5%)
- 111,422 Non Members (78.5%)

Active User Growth

1,250,751 Resources in Libraries

*Active Users are those with at least one current product in their Library.
The Framework and Next Generation Science Standards have a New Vision of Science Learning that Leads to a New Vision of Teaching.

Intertwine three dimensions

• Scientific and Engineering Practices
• Disciplinary Core Ideas
• Cross-cutting Concepts
Teacher Learning and Self-Efficacy

• **Quasi-experimental Design Study:** Across 3 districts finding *significant gains in teacher content knowledge using single SciPack.* (2008). n=45, teachers in grades 5-8

• **Experimental Design Study:** Pretest-posttest delayed-treatment/control group design with random assignment finds *significant gains in teacher content knowledge, teacher self-efficacy, and students’ gain scores for grades 5-8 in treatment group across two SciPacks.* (2009-2010), n = 56

• **Descriptive Study:** Dissertation research finds *significant gains in teacher learning* for pre-posttest and pretest-final assessment. (2010). n = 85, teachers grades 3-6 from 11 different states.


See: [http://learningcenter.nsta.org/research/](http://learningcenter.nsta.org/research/)
Peer-Reviewed Journals, Proceedings, and Books

- First steps towards a social learning analytics for online communities of practice for educators. International Learning Analytics and Knowledge Conference (2012).
What if you could…

• Select existing collections of interactive digital resources to create an engaging suite of content wrapped in an integrated learning community for sharing and discourse with badges, points, and leader boards to engage your students’ learning?

• Track your students’ learning via pre/post assessments tightly coupled to the science content and their professional learning community activities?
| IHEs using the NSTA Learning Center as e-Textbook with science pre-service teachers |
|-----------------------------------|---------------------------------|
| Brenau University                  | Oregon State University Cascades |
| Central Connecticut State University | Plymouth State University       |
| College of Charleston              | Saint Mary's College at Notre Dame |
| Dominican University                | Shippensburg University         |
| Elizabethtown College               | Southern Illinois University Carbondale |
| Florida International University   | University of Central Missouri   |
| Fort Hays State University         | University of Delaware           |
| Idaho State University              | University of Maryland Baltimore County |
| Indiana University-Purdue University Columbus | University of Montana |
| Indiana University South Bend       | University of Regina             |
| Kent State University               | University of South Carolina Aiken |
| Mercer University                  | University of Texas at Tyler     |
| Midwestern State University        | University of Wisconsin Oshkosh  |
| Minnesota State University Moorhead | Virginia Commonwealth University |
| Montana State University Billings   | Virginia Tech                   |
| Northern Arizona University         | Western New Mexico University Gallup |
| Northeastern Illinois University    | Wright State University         |
Dr. Susan M. Blunck
University of Maryland, Baltimore County
• Teaching Science Content & Methods to Pre-Service Teachers
• 15-20 students per semester

One way I use the NSTA Learning Center as my class e-Textbook is…
Dr. Michael Odell
The University of Texas at Tyler
• Science Methods/PBI
• 25-40 students per semester

One way I use the NSTA Learning Center as my class e-Textbook is…
Dr. Kathy Sparrow
Florida International University
• Teaching Science Content & Methods to Pre-Service Teachers
• 2 classes @ 25 students each per semester

One way I use the NSTA Learning Center as my class e-Textbook is…
Carolyn Mohr
Dominican University
• Intro to Teaching Elementary Science
• Science Processes and Concepts for K-8 Teachers
• 2 classes @ 10-15 students per semester

One way I use the NSTA Learning Center as my class e-Textbook is…
Dr. William Veal
College of Charleston
• Elementary and Middle School Science Methods
• 2 classes @ 30-40 students per semester

One way I use the NSTA Learning Center as my class e-Textbook is…
Dr. Kate Baird  
Indiana University-Purdue University Columbus  
• Natural and Social Science Methods  
• 15-24 students per semester  

One way I use the NSTA Learning Center as my class e-Textbook is…
Just wanted to say a HUGE thank you for using the NSTA subscription as a text for our course this semester....I could not agree with a better way to use my textbook money than to subscribe to a great resource like this...also I think this will be one of the most resourceful tools I will use in my future teaching career. Just wanted to acknowledge the awesomeness of this helpful tool.

S. Middleton,
Indiana University South Bend
The Learning Center is Your e-Textbook

Create a truly integrated and blended learning experience for your students with a customized interactive e-textbook leveraging the NSTA Learning Center!

What if you could select from existing collections of interactive web modules, simulations, lesson activities, e-chapters, and video podcasts to create an engaging suite of content that is wrapped in an integrated community for sharing, rating, and discourse with badges, points, and leader boards to engage your students’ learning? What if you could track your students’ learning via pre/post assessments tightly coupled to the science content? Now you can. Create your e-Textbook today.

With the NLC as your e-Textbook, you and your students will be able to:

- Access over 10,000 interactive digital learning resources
- Deepen your knowledge through rich discussions coupled to selected pedagogical and subject matter content
- Motivate and affirm your students’ learning with points, badges, and class-specific leader boards that capture online student engagement and learning

As the class professor, you will be able to:

- Track your students’ activities via the instructor’s dashboard
- Customize your class landing page

UMBC
Across the past three years, UMBC elementary science pre-service teachers, in my graduate and undergraduate elementary science methods courses, have been taking advantage of the learning opportunities provided in the Learning Center. I look forward to extending the experiences this year by having my students set professional development learning goals and provide evidences and reflections to include in their PD Plan and Portfolio. I encourage other university science educators to get their students involved in Learning Center activities. Our pre-service teachers deserve the opportunity to experience NSTA’s innovative, high-quality, online professional development learning experiences as these
Begin creating your course by filling out the following form. If you would like to give access to your Administrator site to other individuals, please enter their e-mail addresses below.

State: Maryland
Institution: University of Maryland Baltimore Coun
Number of Users: 18
Professor: Flavio Mendez
Course: Methods for Teaching Science Elementary Students
Emails of Additional Admins: 
Separate emails with semi-colons (;)
This step is optional

An NSTA collection is a "bundle" of Learning Center resources. URLs of external websites may also be part of an NSTA collection.

Adding an NSTA collection of resources can save your students time and may provide focus to your course. Choose one or more of the NSTA collections below to pre-populate your students' Learning Center libraries. From their "My Resource Collections," students can easily add the resources to their personal libraries.

Note: Finalize your selections of NSTA collections BEFORE your students register for the course. Any changes made to your collection selections after your students register will not be reflected on your students' accounts.

- **Gravity and Orbits: Middle Collection**
  A collection of resources for middle school teachers on the topic of gravity and orbits.
  12 Items
  View all 12 items in this collection

- **Gravity and Orbits: High Collection**
  A collection of resources for high school teachers on the topic of gravity and orbits.
  10 Items
  View all 10 items in this collection

- **The Solar System: Elementary Collection**
  A collection of resources for elementary school teachers on the topic of the solar system.
  12 Items
  Not yet reviewed
  View all 12 items in this collection

- **The Solar System: Middle Collection**
  A collection of resources for middle school teachers on the topic of the solar system.
  15 Items
  Not yet reviewed
  View all 15 items in this collection

How may we improve this process? Please tell us what you think.
Teacher Learning Journeys: Learn Today...Your Way

Use these learning resources and community to design your own long-term growth plan, collaborate with others, and document your growth!

Susan, you’ve already earned 1175 Activity Points!

You’ve recently earned:
- ES Indexer Ultimater
  Complete All Earth/Space Indexers
You’re close to earning:
- Onyx Commenter
  Post 4 more comment/questions

Welcome Spring 2013 Students!

Last class we enjoyed learning about the different objects in the solar system through the students’ alien inventions - very informative. It was also fun to learn about the Sun through song from the Astrocappella group.

Register for this web seminar, April 18: Properties of Living Things: Searching for Fingerprints of Life on Mars.

Class stats to date:
Students’ average score (77%) in solar system post-assessment vs. (66%) in pre-assessment. Good job!

- Activity points: 15,540
- Number of posts: 39
- Number of reviews: 16
- SciPacks completed: 7
- Collections shared: 37
- Resources added to library: 727
The NSTA Learning Center for Preservice Teachers

Thousands of interactive resources and useful tools are at your fingertips when you use the NSTA Learning Center. As a preservice teacher, you can access these resources, store them in a personal library, and return to them as needed throughout your career. You can also choose to upload your own files or notes to your library, making a secure and available collection of resources that suit your personal and professional needs.

Your professor may have created a collection of specific resources for your course and placed those in your library in the Learning Center, under the tab labeled "My Resource Collections.”

From the dropdown menu below select your state, institution, professor, and course. Your subscription to the e-learning resources will be added to your cart for purchase. The fee is $99 for your subscription. Please pay with your credit card to access your personal resources in your library.

State: [Illinois]
Institution: [Dominican University, summer 13]
Professor: [Carolyn Mohr]
Course: [Choose a Course]
On-going support for you and your students:

• NLC Overview:
  Two private orientation web seminars for students (and professors!) about the NSTA Learning Center:

  - January 23, 7:15 pm Eastern
  - February 4, 7:15 pm Eastern

• Online advisors and content mentors:
  Navigation assistance, finding resources, learning how to use the tools; answer SciPack content questions

• Help desk:
  Technical assistance
Instructor Dashboard
Accountability system for professors; collect data on usage by individual, manage the content on your class landing page, analyze pre/post test scores and other activity data.

<table>
<thead>
<tr>
<th>Number of Licenses Purchased:</th>
<th>Number of Licenses Used:</th>
<th>% Used:</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>45</td>
<td>90%</td>
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</table>

**Total Products Added by Type**

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Number Added:</th>
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<tbody>
<tr>
<td>Journal Article</td>
<td>261</td>
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<tr>
<td>SciPack</td>
<td>127</td>
</tr>
<tr>
<td>Science Object</td>
<td>83</td>
</tr>
<tr>
<td>Book Chapter</td>
<td>59</td>
</tr>
<tr>
<td>SciGuide</td>
<td>41</td>
</tr>
<tr>
<td>Podcast</td>
<td>8</td>
</tr>
<tr>
<td>Web Seminar Archive</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>585</strong></td>
</tr>
</tbody>
</table>
### Individual Users

Click on a user's name to see all of the resources they've added to their library via the subscription.

- [Export Pre/Post-Test Results (sorted by SciPack)](#)
- [View overall activity for this group](#)

<table>
<thead>
<tr>
<th>User</th>
<th>Date Registered</th>
<th># of Resources via Subscription</th>
<th>Last Active</th>
<th>Activity Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher name</td>
<td>02/03/2013 1:42 PM</td>
<td>33</td>
<td>03/25/2013 5:43 PM</td>
<td>1345</td>
</tr>
<tr>
<td>Teacher name</td>
<td>09/24/2011 9:58 PM</td>
<td>56</td>
<td>04/02/2013 7:55 PM</td>
<td>1165</td>
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<tr>
<td>Teacher name</td>
<td>02/06/2013 1:50 PM</td>
<td>24</td>
<td>04/01/2013 9:00 PM</td>
<td>1270</td>
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<tr>
<td>Teacher name</td>
<td>01/31/2013 9:13 PM</td>
<td>0</td>
<td>02/04/2013 1:14 PM</td>
<td>0</td>
</tr>
<tr>
<td>Teacher name</td>
<td>02/11/2013 10:09 PM</td>
<td>24</td>
<td>03/14/2013 7:53 PM</td>
<td>1210</td>
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<tr>
<td>Teacher name</td>
<td>03/05/2013 9:10 AM</td>
<td>163</td>
<td>04/02/2013 4:08 PM</td>
<td>2610</td>
</tr>
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<td>Teacher name</td>
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<td>04/01/2013 9:03 PM</td>
<td>2265</td>
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<td>Teacher name</td>
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<td>04/02/2013 7:36 PM</td>
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<td>41</td>
<td>03/27/2013 11:23 AM</td>
<td>1115</td>
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</table>
### Pre/Post Test Results

<table>
<thead>
<tr>
<th>Test</th>
<th>Date Completed</th>
<th>Results</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar System Pre-Assessment</td>
<td>2/27/2013 6:01 PM</td>
<td>12/20</td>
<td>60%</td>
</tr>
<tr>
<td>Solar System Post-Assessment</td>
<td>3/12/2013 10:42 AM</td>
<td>17/20</td>
<td>85%</td>
</tr>
<tr>
<td>Earth and Space Science Indexer</td>
<td>3/3/2013 9:02 AM</td>
<td>26/40</td>
<td>65%</td>
</tr>
<tr>
<td>Life Science Indexer</td>
<td>3/3/2013 10:01 AM</td>
<td>33/50</td>
<td>66%</td>
</tr>
<tr>
<td>Physical Science Indexer</td>
<td>3/3/2013 10:34 AM</td>
<td>22/30</td>
<td>73%</td>
</tr>
</tbody>
</table>
### Activity

#### Overall Group Activity

- **9/1/2012** to **12/31/2012**

- **75255 Total Points**
  - 1134 Add NSTA Resource
  - 88 Create Collection
  - 42 Complete Indexer
  - 0 Add Event
  - 1 Add Personal Resource
  - 33 Attend Web Seminar
  - 42 Complete SciPack
  - 43 Write Review
  - 10 Recommend Resource
  - 62 Post comment/question
  - 66 Share Collection
  - 33 Publicize Collection
  - 20 Create Portfolio
  - 390 Create Portfolio Goal
  - 298 Upload Evidence
  - 163 Complete Reflection
  - 39 Generate Report

### Activity

#### Activity for Teacher name

- **9/1/2012** to **12/31/2012**

- **3955 Total Points**
  - 69 Add NSTA Resource
  - 1 Create Collection
  - 1 Complete Indexer
  - 0 Add Event
  - 0 Add Personal Resource
  - 4 Attend Web Seminar
  - 3 Complete SciPack
  - 1 Write Review
  - 0 Recommend Resource
  - 3 Post comment/question
  - 2 Share Collection
  - 2 Publicize Collection
  - 1 Create Portfolio
  - 16 Create Portfolio Goal
  - 18 Upload Evidence
  - 9 Complete Reflection
  - 1 Generate Report
The NSTA Learning Center

Tools, Resources, and Community

http://learningcenter.nsta.org
Interactive web modules: SciPacks

10-Hour, self-directed, learning experience

Assessment and Certification

Content Mentor Email Support

Pedagogical Implications

3-5 Science Objects
<table>
<thead>
<tr>
<th>Earth and Space</th>
<th>Physical</th>
<th>Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Earth, Sun, and Moon</td>
<td>• Force and Motion</td>
<td>• Cell Structure and Function</td>
</tr>
<tr>
<td>• Gravity and Orbits</td>
<td>• Energy</td>
<td>• Coral Reef Ecosystems</td>
</tr>
<tr>
<td>• The Solar System</td>
<td>• Nature of Light</td>
<td>• Science of Food Safety</td>
</tr>
<tr>
<td>• The Universe</td>
<td>• Chemical Reactions</td>
<td>• Resources and Human Impact</td>
</tr>
<tr>
<td>• Weather and Climate</td>
<td>• Electric and Magnetic Forces</td>
<td>• Nutrition</td>
</tr>
<tr>
<td>• Rocks</td>
<td>• Atomic Structure</td>
<td>• Cell Division and Differentiation</td>
</tr>
<tr>
<td>• Plate Tectonics</td>
<td>• Explaining Matter with Elements, Atoms, and</td>
<td>• Cells and Chemical Reactions</td>
</tr>
<tr>
<td>• Earth’s Changing Surface</td>
<td>Molecules</td>
<td>• Flow of Matter and Energy in Ecosystems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Interdependence of Life</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Heredity and Variation</td>
</tr>
</tbody>
</table>
LIVE INTERACTIVE LEARNING @ YOUR DESKTOP

Learn more about the NSTA Learning Center!
Join one of our upcoming Web Seminars

Enhance and Extend Your Professional Learning with the Learning Center
January 30, 2014
6:30-8:00 p.m.
Eastern Time

Using the NSTA Learning Center as Your e-Textbook with Pre-service Teachers
February 20, 2014
7:30-9:00 p.m.
Eastern Time

All web seminars are free. Participants receive a free SciPack and a Certificate!
Register for all upcoming web seminars and view more than 500 archives at
http://learningcenter.nsta.org/webseminars
What else is available in the NLC?

- All public collections (*Over 4,400*)
- All public community forums (12)
- All conference materials (4,688)
- Online advisors, Content mentors, Help desk
- Over 11,200 digital resources
  - Journal Articles (5,894)
  - e-Book chapters (*Over 2,218*)
  - Science Objects (94)
  - Sci Packs (25)
  - Web Seminar archives & podcasts (~1,900)
  - External Resources: NASA, NDEP (55 STEM videos)
My Community Forums

Over 2K Topics; 20K posts

12 Public Forums, including:

- Physical, Life, Earth/space Science
- NGSS
- Evaluation/Assessment
- Research in Science Ed
- Elementary Science
- New Teachers
- Your own Private Forum
**About Me:** I am the Grade 6-12 Science Teacher at a private Alternative Education school.

**Affiliation:** Children’s Center for Treatment and Education

**Location:** Custer City, Pennsylvania
<table>
<thead>
<tr>
<th></th>
<th><strong>Option 1: $67 per student</strong></th>
<th><strong>Option 2: $99 per student</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Class landing page</td>
<td>Class landing page (with branding), custom text and home button; class landing page (with branding), custom text and home button; link back to institution; local leader boards</td>
<td>same</td>
</tr>
<tr>
<td></td>
<td>link back to institution; local leader boards</td>
<td>same</td>
</tr>
<tr>
<td>Private community forum (optional)</td>
<td>Private community forum (optional)</td>
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</tr>
<tr>
<td>Pre/post assessment items (optional)</td>
<td>Pre/post assessment items (optional)</td>
<td>same</td>
</tr>
<tr>
<td>Online advisors, content mentors, help desk, online orientation</td>
<td>Online advisors, content mentors, help desk, online orientation</td>
<td>same</td>
</tr>
<tr>
<td>Student: All NLC fee-based resources free for 6-months (except: books, e-books, online courses); tools, forums</td>
<td>Student: All NLC fee-based resources free for 6-months (except: books, e-books, online courses); tools, forums</td>
<td>Student: All NLC fee-based resources free for 1-year (except: books, e-books, online courses); tools, forums</td>
</tr>
<tr>
<td>Student: 1-year NSTA Student Membership ($35 value)</td>
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<td>same</td>
</tr>
<tr>
<td>Professor: All NLC fee-based resources free for 6-months (except: books, e-books, online courses); tools, forums</td>
<td>Professor: All NLC fee-based resources free for 6-months (except: books, e-books, online courses); tools, forums</td>
<td>Professor: All NLC fee-based resources free for 1-year (except: books, e-books, online courses); tools, forums</td>
</tr>
<tr>
<td>Professor: Access to administrator dashboard with usage data, assessments scores</td>
<td>Professor: Access to administrator dashboard with usage data, assessments scores</td>
<td>same</td>
</tr>
</tbody>
</table>
University/college bookstore subscription course card available *(includes unique Learning Center code)*
Panel discussion

Al Byers, Moderator
Kate Baird, Indiana University-Purdue University Columbus
Susan Blunck, University of Maryland Baltimore County
Carolyn Mohr, Dominican University
Michael Odell, University of Texas at Tyler
Kathy Sparrow, Florida International University
William Veal, College of Charleston
Exploration

http://learningcenter.nsta.org
Let’s vote for three actions on this list!

_____ Create/access your Learning Center account
_____ Update your profile
_____ Add NSTA resources to your library
_____ Add personal resources to your library
_____ Create a class landing page for e-textbook (Steps 1&2)
_____ Explore the forums (read/post)
_____ Create a sample collection (at least 3 resources)
_____ Share the collection with a person attending this workshop
_____ Share the collection with a person not attending this workshop
_____ Make your collection public
_____ Do a search by keyword
_____ Do an advanced search by keyword; search for user created collections
_____ Register to attend a web seminar (Suggested: 1/30 and/or 2/20)
_____ Recommend a resource to a friend
_____ Check the leader boards
_____ Ask a question to an online advisor
_____ Open one of your resources, explore it, and write a review about it
_____ Speak/ask questions to one of the panelists
_____ Complete a PD Indexer
Survey

http://learningcenter.nsta.org
If you like to learn more about using the Learning Center stop by our table here at ASTE and/or contact Flavio Mendez to set up an appointment.

fmendez@nsta.org
703-312-9250
Thank you!

Al Byers and Flavio Mendez, NSTA
Kate Baird, Indiana University-Purdue University Columbus
Susan Blunck, University of Maryland Baltimore County
Carolyn Mohr, Dominican University
Michael Odell, University of Texas at Tyler
Kathy Sparrow, Florida International University
William Veal, College of Charleston
Additional slides
NSTA Learning Center

Integrating NSTA/CAEP Standard 6
NSTA Preservice 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.

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.
Interpretation

- 6a: Professional knowledge and skills for science content area.

- 6b: Professional knowledge and skills for science education area.
6a: Science Content Learning

- Pre and post-assessments

Evidence or Data?

- Write a report with a rubric that includes criteria about learning science content in a PD environment.
- T-tests of pre and post-test results.
6b: Science Education


Evidence or Data?

- Write a report to reflect on the experience and what the candidate learned. Rubric criteria reflect these items.
- A checklist for attendance does not reflect the intent of the standard.