

The NSTA Learning Center

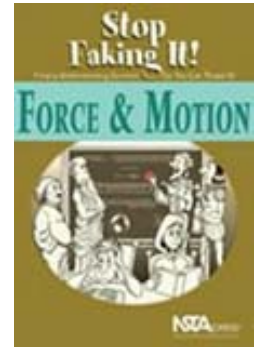
Developing Sustainable Online Learning
at Scale to Accommodate Diverse
Learning Preferences and Needs

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National Science Teachers Association

...to promote excellence and innovation in science teaching and learning for all.

- **Non-Profit Membership Association**
- **4 Conferences/year (~20,000 teachers/13 days)**
- **NSTA Press (~20-30 Books/year)**
- **4 separate NSTA Journals (~3,400 lesson plans)**
- **K-12 e-Teacher Network (~400,000 teachers)**
 - **3 monthly thematic e-newsletters**
 - **Weekly NSTA Express newsletter**
 - **NSTA SciLinks**
 - **NSTA Learning Center**



The Professional Development Landscape

A significant, ***positive*** correlation exists between ***student achievement and teachers' content knowledge***

(subject matter AND pedagogical content knowledge).

Detrimental classroom effects when teachers do not feel confident in their knowledge of science.



Aaronson, Barrow and Sander, 2003; Bransford, Brown,; Clermont & Borko, 1994; Cochran-Smith and Zeichner, 2005; Cocking, Donovan, & Pellegrino, 2000 Darling-Hammond, 2006; Darling-Hammond and Bransford, 2005; Economic Policy Institute, 2003; Goldhaber, 2002; Goldhaber and Brewer, 1998; Goldhaber and Brewer, 2000; Jepsen, 2004; Kane, Rockoff and Staiger, 2006; Ma, 1999; Monk, 1994; Rivkin, Hanushek, and Kain, 2005; Rockoff 2004; Sanders and Rivers, 1996; Shulman, 1986, 1987; Wenglinsky, 2002; Wilson, Floden and Ferrini-Mundy, 2001. Council of Chief State School Officers: Blank, R.K., Alas, N., & Smith, C. 2008.; Mestre & Cocking, 2002; Weinburgh, Smith, & Clark, 2008; Whitehurst, 2002; Wilson, Floden, & Ferrini-Mundy, 2002.

The Professional Development Landscape

**What we know—Local Systemic Change K-8 Evaluation:
(75,000 data points -10 yr NSF Longitudinal study)**

**Teachers of Science with *less* than
16 hours of PD in last year:**

- What % at K-4 level? **76%**
- What % at 5-8 level? **57%**
- What % at 9-12 level? **32%**



**Research calls for 50-80 hours per year to effect a
change in practice.**

Take Away: Those that need it most, getting least of it!

Statistics Regarding Professional Development



- What is return-on-investment for face-to-face Professional Development?

2006 US Math/Science Partnerships: Funded 501 projects at \$181M. Average award: \$337,000.

Average # teachers impacted/project: ~110 teachers.

Total Teachers Impacted: 56,000. Total in US: 3 Million

- How many have completed an online professional development course?

You are not alone: In 2008 over 3.9 million learners in the US took a course online...

(The Sloan Consortium: Staying the Course: 2008; Project Tomorrow; National Survey on Internet Use; 2008).

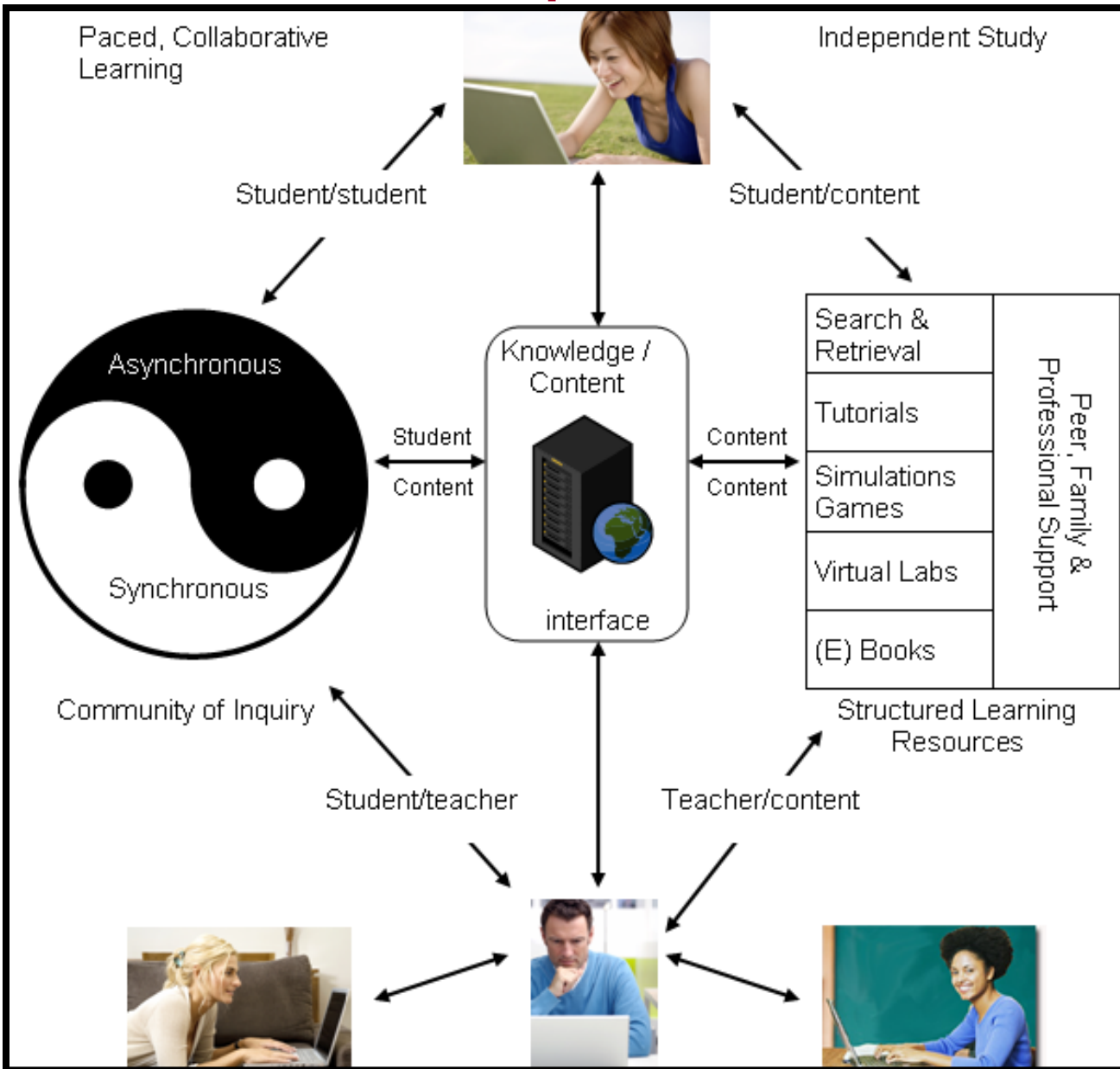
Take Away: Clearly need for online PD to address scale and it is happening already!

A Critical Piece of the PD Solution

- Self-Directed, Moderated, & On-Demand Access
- 5,500+ resources & opportunities
- Tools to help adult teachers organize, personalize, and document their growth over time.

The screenshot displays the NSTA Learning Center website. At the top, there is a navigation bar with links for 'Back to NSTA.org', 'Contact Us', 'Help', and 'Feedback'. The main header features the 'The NSTA Learning Center' logo and a search bar. Below the header is a menu with options: 'Home', 'My Account', 'Subjects', 'Learning Resources & Opportunities', 'Professional Development Tools', and 'Education Administrator'. The user is logged in as 'Albert' and has access to 'View Cart', 'Admin', and 'Log Out' options. The main content area is titled 'My Learning Center' and includes a 'Welcome to Your Professional Development Web Space!' message. It offers links to 'Explore Learning Opportunities', 'See all FREE Resources', and 'Advanced Search'. There are three filters: 'By Subject' (Earth & Space Science, Life Science, Physical Science), 'By Grade Level' (Elementary, Middle School, High School, College), and 'By State Standards' (with a 'Choose a state' dropdown). Two learning options are highlighted: 'Do-It-Yourself Learning' (1-2 or 6-10 hour interactive activities) and 'Live Online Seminars & Classes' (1-2 hour seminars, week and month long courses). On the right side, there are sections for 'Featured PD Resource' (Science OBJECTS: Nature of Light: Light as Waves), 'NSTA Featured Resources' (Science OBJECTS: Building Teacher Science Content Knowledge), and 'Most Popular Resources' (1. Doing Good Science in Middle School: A Practical Guide to In...; 2. A Head Start on Science: Encouraging a Sense of Wonder).

Anderson's Equivalence of Interaction Theorem

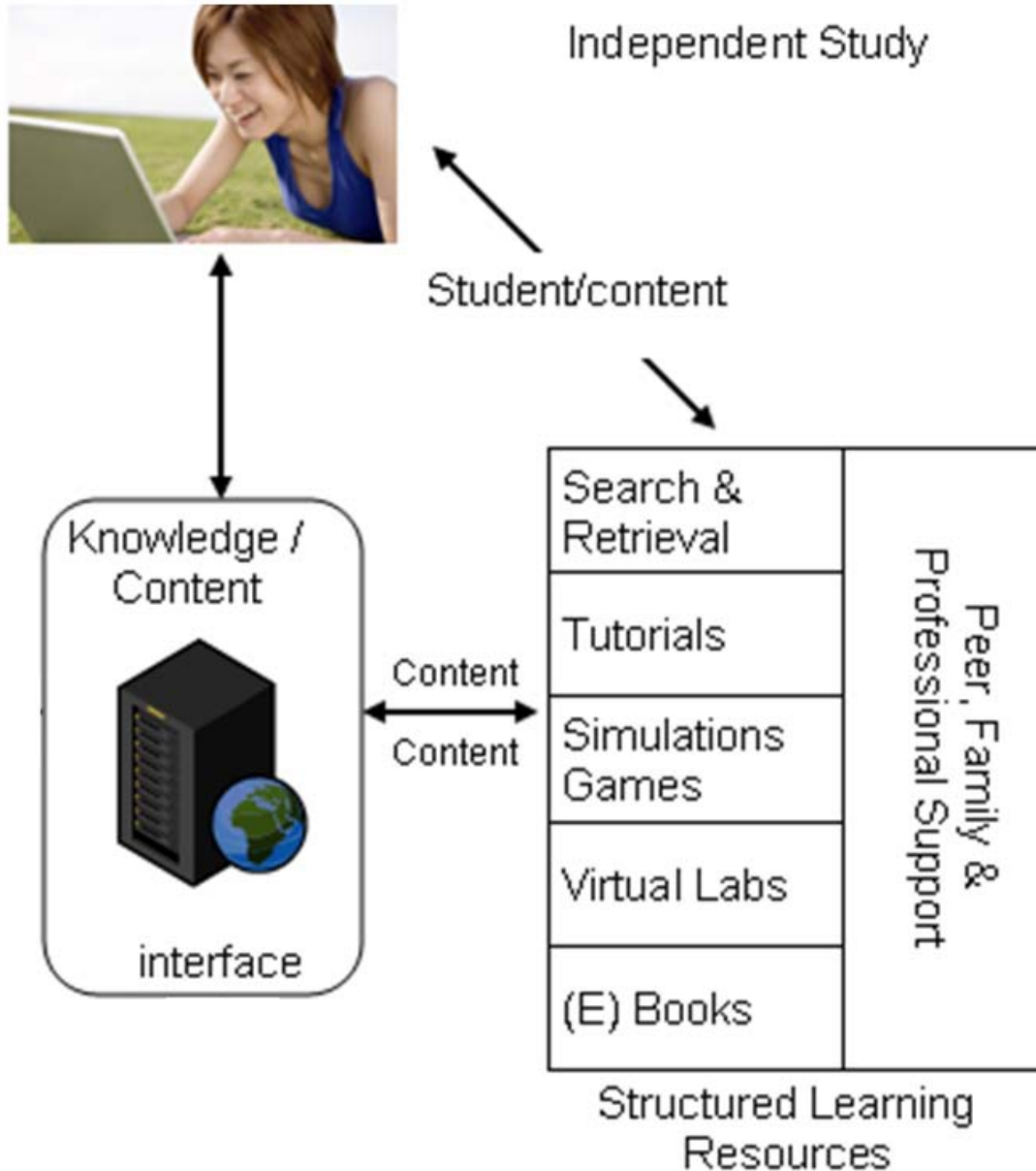


Learning online comprises 3 types of interaction strategies:

- Learner-learner
- Learner-instructor
- Learner-content

If one of three offered is sufficiently rich, other two may be offered in reduced capacity and still provide sufficient learning via a most cost efficient and scalable model.

Anderson's Equivalence of Interaction

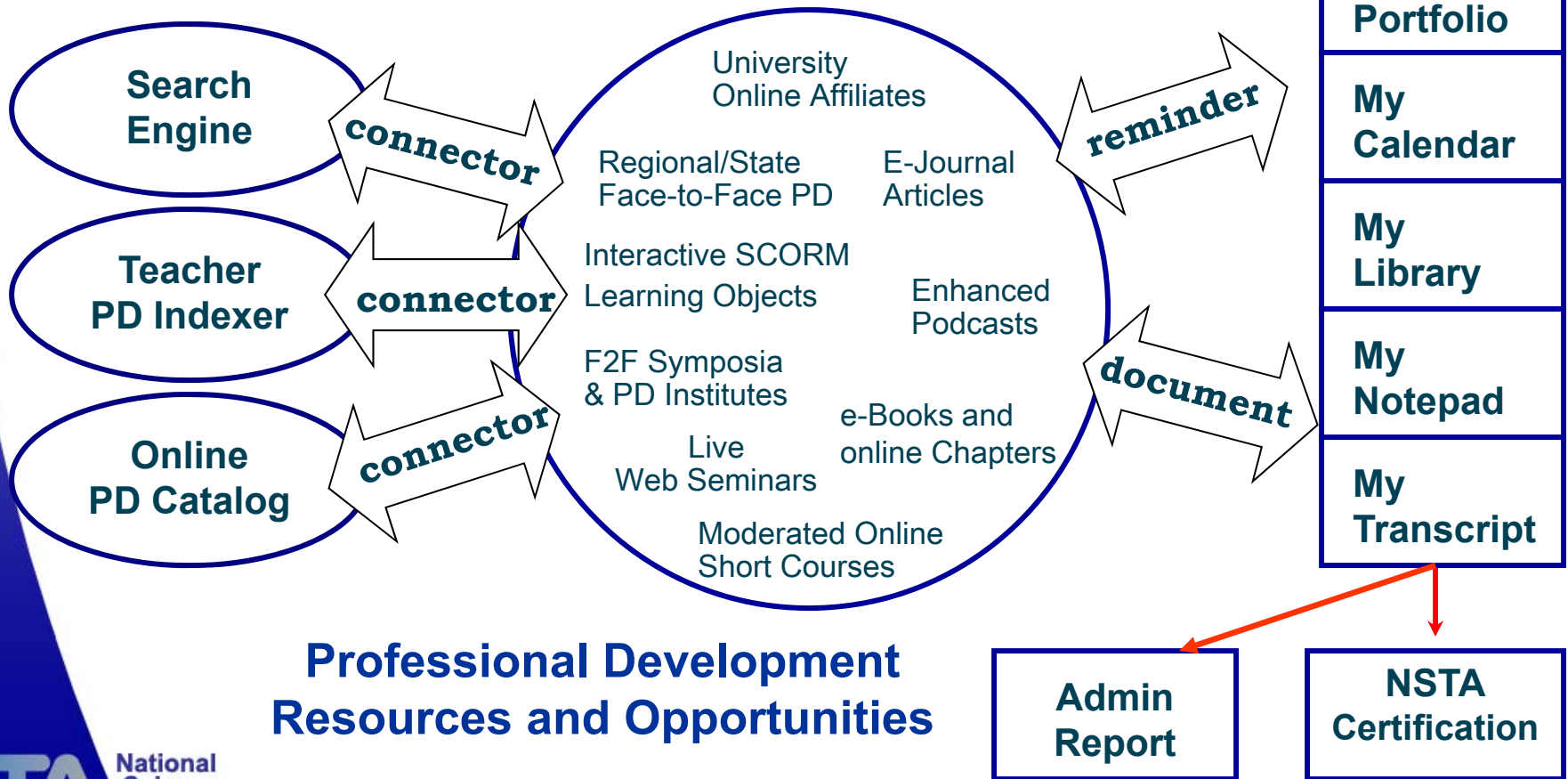


Many focus on learner-instructor interaction via moderated online courses.

NSTA provides and hosts online short courses, but we also are focusing on importance and learning efficacy of learner-content interaction via on-demand self-directed Learning via Science Objects and SciPacks

Scalable, Sustainable, and Customized Professional Development

The NSTA Learning Center



The NSTA Learning Center

Nov 2010 Collection: **5,500+** PD Resources and Opportunities Available



Do-It-Yourself Learning



Live Online Seminars & Classes

SciGuides [35]

Science Objects [74]

SciPacks [19]

Archived Seminars/Podcast [390+]

Web Seminars [120+/yr]

Online Courses [30+/year]

NSTA Short Courses [7/year]



Books & Articles



In Person Experiences

Journal Articles [3400+]

NSTA Press Books [257]

e-Books [139]

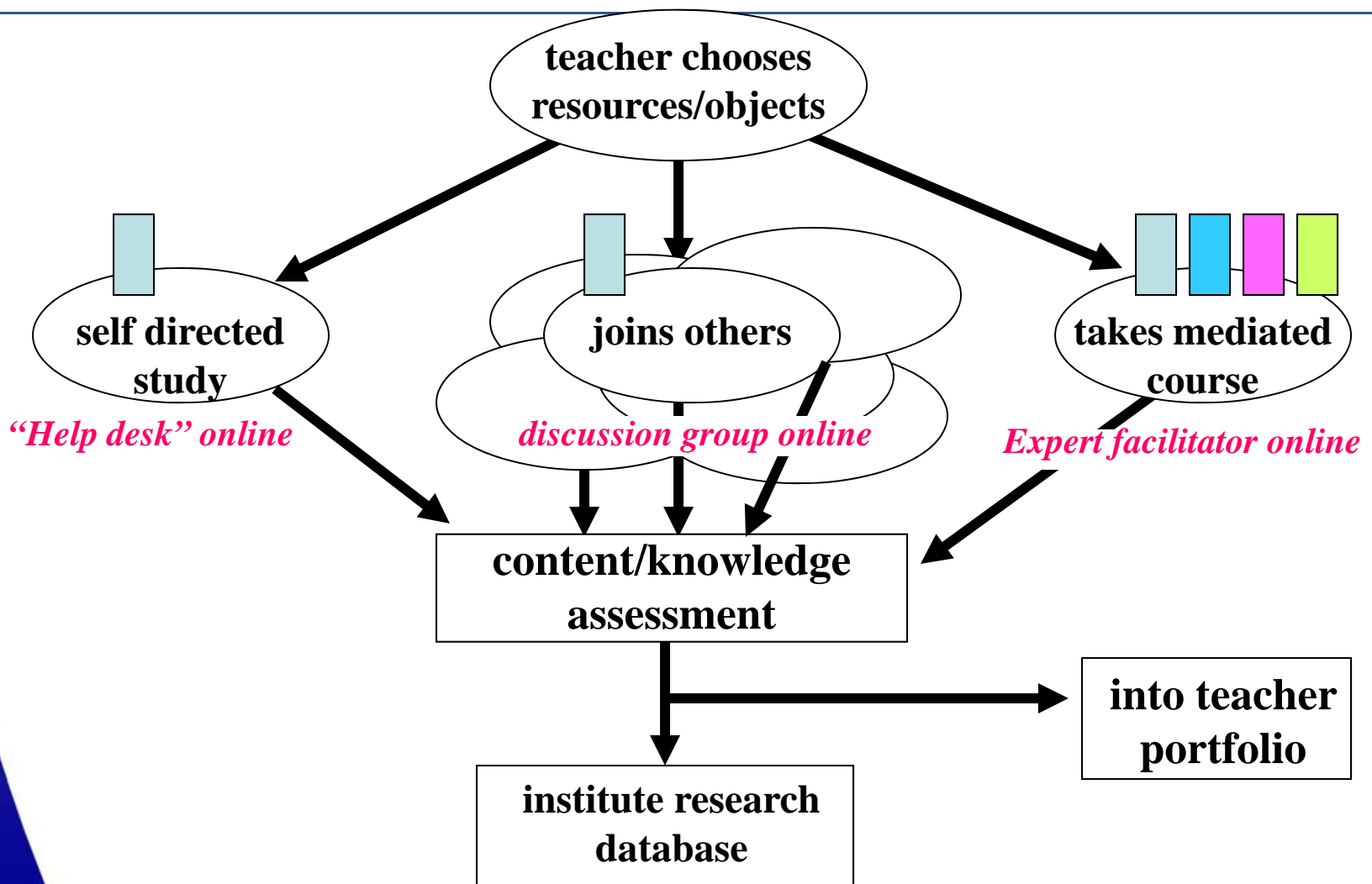
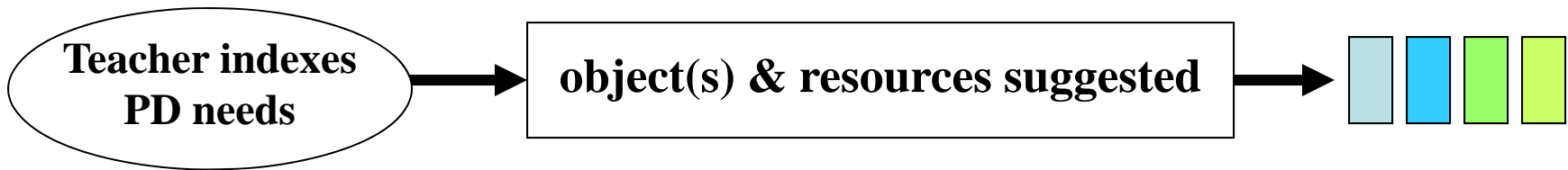
e-Chapters [815]

Symposia [5-9/year]

PD Institutes [6-10/year]

Summer Academies [4/year]

NSTA Conferences [4/year]



The **NSTA** Learning Center



Content Collaborators



S.D. Bechtel, Jr.
Foundation



Agilent
Technologies
Foundation

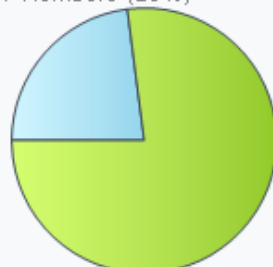
The NSTA Learning Center Impact and Dissemination



**Over 68,000
Individual
accounts with
over 500,000
resources
added from
5,500 across
teachers'
personal
libraries as of
Nov 2010**

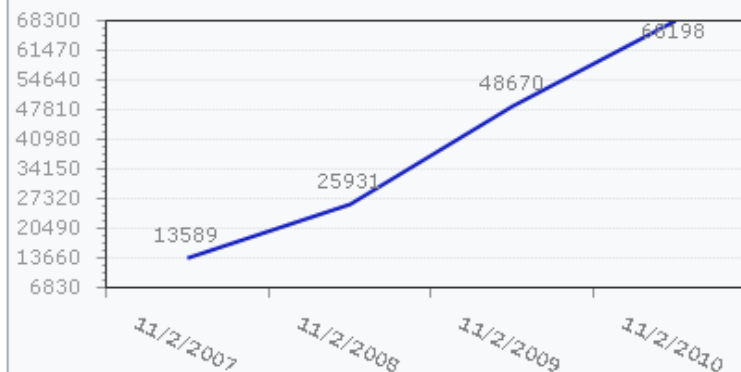
68,198 Active Users*

15,657 Members (23%)

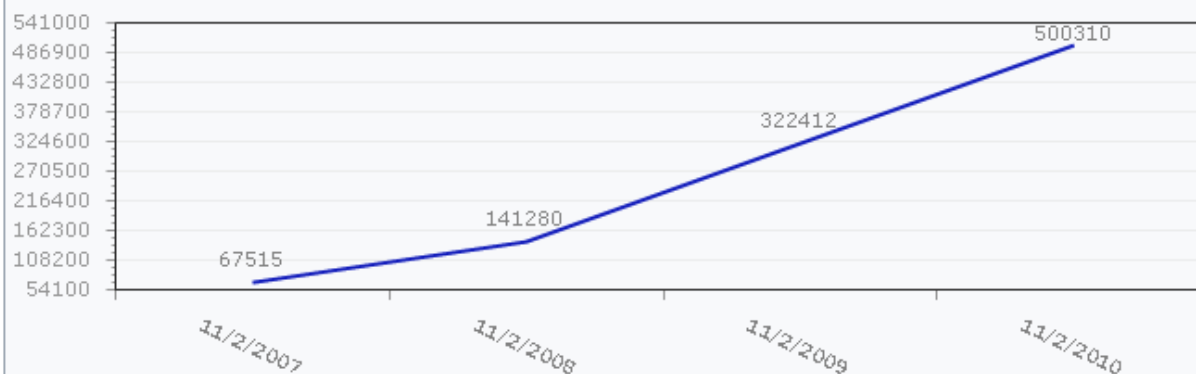


52,541 Non-Members (77%)

Active User Growth



500,310 Resources in Libraries





**Over 210
unique
deployments
across 65
State/District
Partnerships
as of
November
2010**

- West Virginia Department of Education
- New Hampshire Department of Education
- Hawaii Department of Education
- Nebraska Department of Education
- Fairfax County Public Schools, Fairfax, VA
- Cincinnati Public Schools, OH
- Louisville County Public Schools, Louisville, KY
- Gwinnett and Forsyth County Public Schools, Atlanta, GA
- Lincoln County Public Schools, NE
- LASER Alliance, Mountain to Harbor Alliance, WA
- Marysville Joint Unified School District, CA
- Chicago Public Schools, Chicago IL
- Montana State University, Bozeman, MT
- Petaluma City Schools, Petaluma, CA
- Shelby County Public Schools, TN
- Duval County Public Schools, Jacksonville, FL
- Texas Education Service Center, University of Texas,
- Texas A&M, Texas Centers for Excellence in Science and Mathematics (36 centers across Texas)
- Arlington County Public Schools, Arlington, VA
- Stamford County Public Schools, Stamford, CT
- University of Maryland Baltimore County, MD
- Atlanta Public Schools System, Atlanta, GA

Featured e-PD resources within the Learning Center



- 2 hour free online learning experience
- Interactive simulations of science phenomena
- Inquiry-based questions to promote interaction and learning
- Based on science literacy goals in science education standards



- Newton's First Law
 - Introduction
 - Objects at Rest
 - Objects in Motion
 - The 2nd Part
 - Challenge
 - Alternate Explanation
 - Animation**
 - What's the Point?
 - Making Sense of It
 - Combining the Parts
 - Evaluation
 - Glossary
 - Credits



What type of pattern did you observe?

- I didn't run the simulation, but I can imagine what will happen.
- The more the track changed in shape, the higher the ball rose in vertical height at the end of the track.
- The ball would rise to a different vertical height at the end of the track depending on the track chosen.
- The ball rose to approximately the same vertical height no matter what track was used in the simulation

Check

Tries Remaining: 3



Hands-On Activity

You can do this simulation in real life. All you need is a section of Hot Wheels[®] track, a marble or ball bearing, a ruler, and a friend to help. Then select the link to go to the Activity:

[Hands-On Activity](#)

Press "Next" at the top of this window to go on to *What's the Point?*.

Hands-On Activity

Grab a ruler or meterstick, a marble or a ball bearing, and about a meter-long section of Hot Wheels® track. If you don't have access to kids' toys, just use anything you can find that's flexible and will allow a marble to roll along it. What works well is a section of clear plastic tubing (try the hardware or plumbing supply store) and a ball bearing that's small enough to roll freely inside the tubing.

Find a friend or family member to help you with this next part. Hold the track in a U shape so the lowest part just touches a table top or a floor, as seen in Figure 3.10.

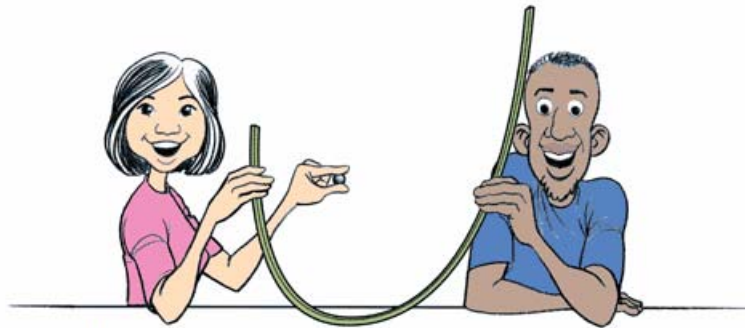
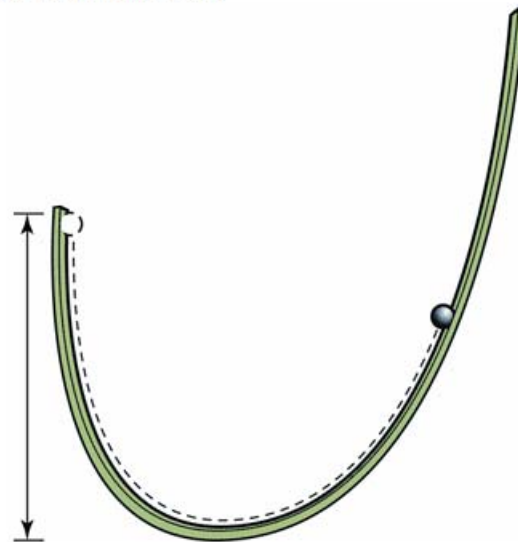


Figure 3.10

Now measure the vertical distance from the floor or table to one end of the track. For the directionally challenged, that vertical distance is shown in Figure 3.11.



If your memory isn't great, write this distance down. You'll need to keep this one side of the track at that same vertical distance as you do the next few things. With your accomplice helping you, hold the track in a U shape with the bottom of the U touching the table or floor; holding your end at the vertical distance you've measured, drop the marble at the top of that end of the track.

Free Science Objects: Growth Since July 2007



**2007: 16,555 objects
in 4,757 accounts.**

**2008: 51,442 objects
in 8,090 accounts.**

**2009: 96,165 objects
in 21,000 accounts.**

**2010: 137,587 objects
in 27,317 accounts
through the 3rd quarter**



Growth over last 3 years across selected e-PD resources positive

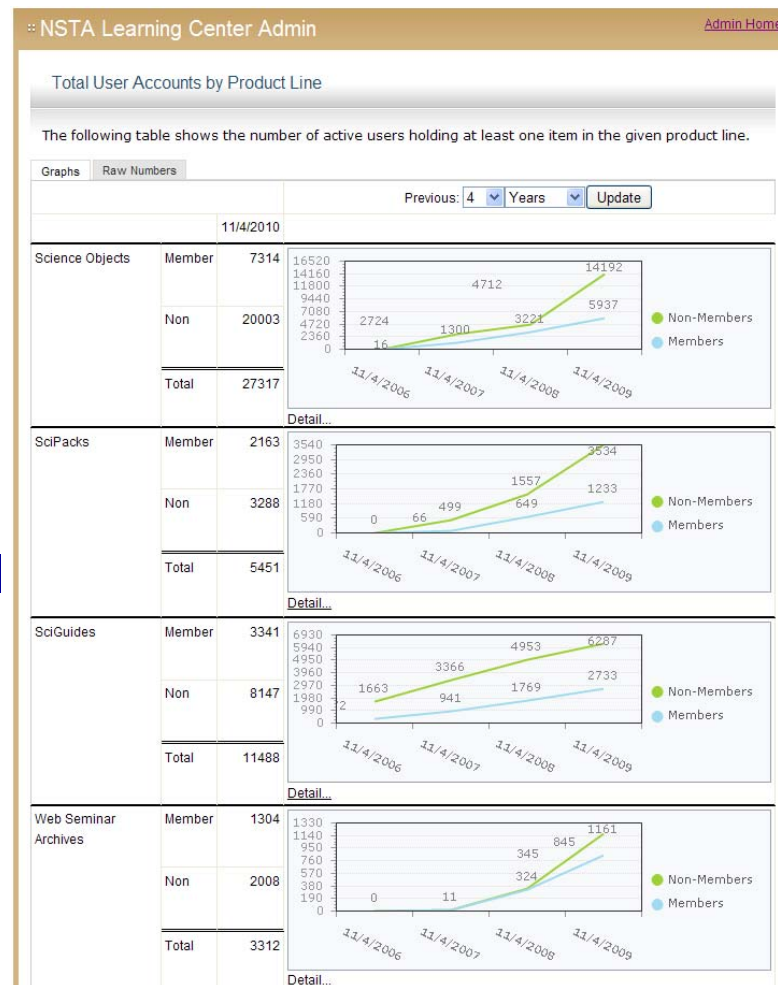


Science Objects: 137,587 Objects have been added to individuals' libraries.

SciPacks: 22,794 packs have been added to individuals' personal libraries.

SciGuides: 36,579 guides have been added to individuals' personal libraries.

Web Seminar Archives: 14,165 seminar archives AND their derivative podcasts have been added to individual's libraries



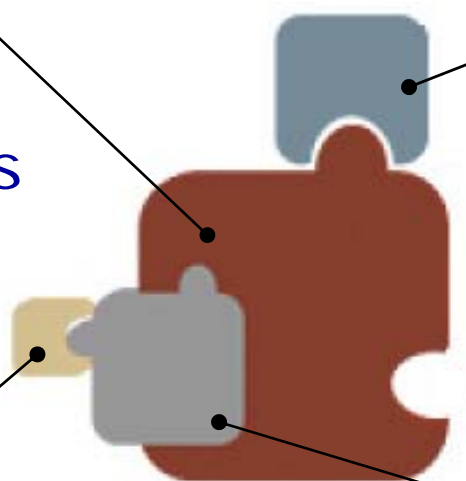
Featured e-PD resources within the Learning Center



- 10 Hour Online and On-Demand e-PD Teacher Learning Experience
- 3-5 Free Science Objects, **plus**
 - Individualized email support
 - Pedagogical Implications component
 - Opportunity for Certification by passing a Final Assessment



3-5 Science Objects



SciPack



Content Mentor
Email Support



Assessment
and Certification



Pedagogical
Implications

Frequency of Interaction in one self-directed web module

Learner-Content Interaction Type	Interactive Components within Content-Interaction Type	Number of Instances within web module
Interactive Reference	Audio component for playback (identical to text narrative, available on every page in web module)	63
	Picture Slide-Shows (click next, view images as answer question)	3
	Animations (user press play to view animation, may contain sound)	6
	Check Your Thinking/Hint (question with mouse-over feedback)	22
	Glossary of Terms in F&M SciPack (12 terms)	1
Simulations	Flash simulations (user makes selections/decisions within Flash, view results)	13
Personalized Feedback	Embedded questions throughout the content and quiz questions at the end of each topic within the web module (multiple choice, ordering, drag/drop, hot spot), no score presented, rich feedback after choices made	52
Hands-on Opportunities	Discrete hands-on activities embedded within module	8
Pedagogical Implications	Pedagogical Implications Component (broken out by grade level: K-2, 3-5, 6-8, 9-12). Suggests instructional strategies, known student preconceptions, and what is cognitively appropriate for students by grade band for science content areas (approximately 18 pages, 7,500 words)	1



The NSTA Learning Center

Impact Studies for SciPacks



Three Recent Studies

- Quasi-experimental design study across 3 districts finding *significant gains in teacher content knowledge and self-efficacy*. (2008)
- One 2 pretest-posttest delayed-treatment control group design with random assignment finds *significant gains in teacher content knowledge, teacher self-efficacy, and students' learning for grades 5-8 in treatment group*. (2010)
- One descriptive study using repeated measures ANOVA and paired-sample *t*-tests found *significant gains in teacher learning* for pre-posttest and pretest-final assessment for 85 teachers in grades 3-6 across 7 SciPacks. (2010)



SciPack Three District Pilot

Participant Feedback: Confidence in teaching subject matter:

- 7%: Very Confident *Before* completing F&M SciPack**
- 60%: Very Confident *After* completing F&M SciPack**
- 98%: Found SciPack content relevant to their needs**
- 96%: Would recommend SciPack to their colleagues**
- 98%: Found interactive simulations worthwhile to their learning**

Pre/Post Assessment and Final Assessment Results

- **Horizon Research Instrument: Positive *significant gains in learning* between pre/post test**
- **Final assessment: 92% passed the final assessment**

Evaluation of Online, On-Demand Science Professional Development Material Involving Two Different Implementation Models (Sherman & Byers)

Journal Science Education and Technology

February, 2008 (Vol. 17, No. 1)



District SciPack Efficacy Study: Third Party Evaluation Report

- Two pretest-posttest delayed-treatment control group design involving random assignment
- 56 teachers from grades 5-8 across (2 SciPacks completed)
- *Significant gains in teachers' content knowledge* in treatment group vs. control (Repeated Measures ANOVA)
(SciPack 1: $F(1, 24) = 20.680, p < .01$; SciPacks 2: $F(1, 26) = 5.877, p < .05$)
- *Significant gains* in feelings of preparedness to teach concepts
- *Significant gains in students' learning* across both groups with significantly higher gains scores in treatment group
- *Qualitative Teacher Comments: I have a better understanding of Newton's Law, so I can envision the things I see. The Force and Motion, I thought the interactives were really, really good.*



Independent SciPack Study

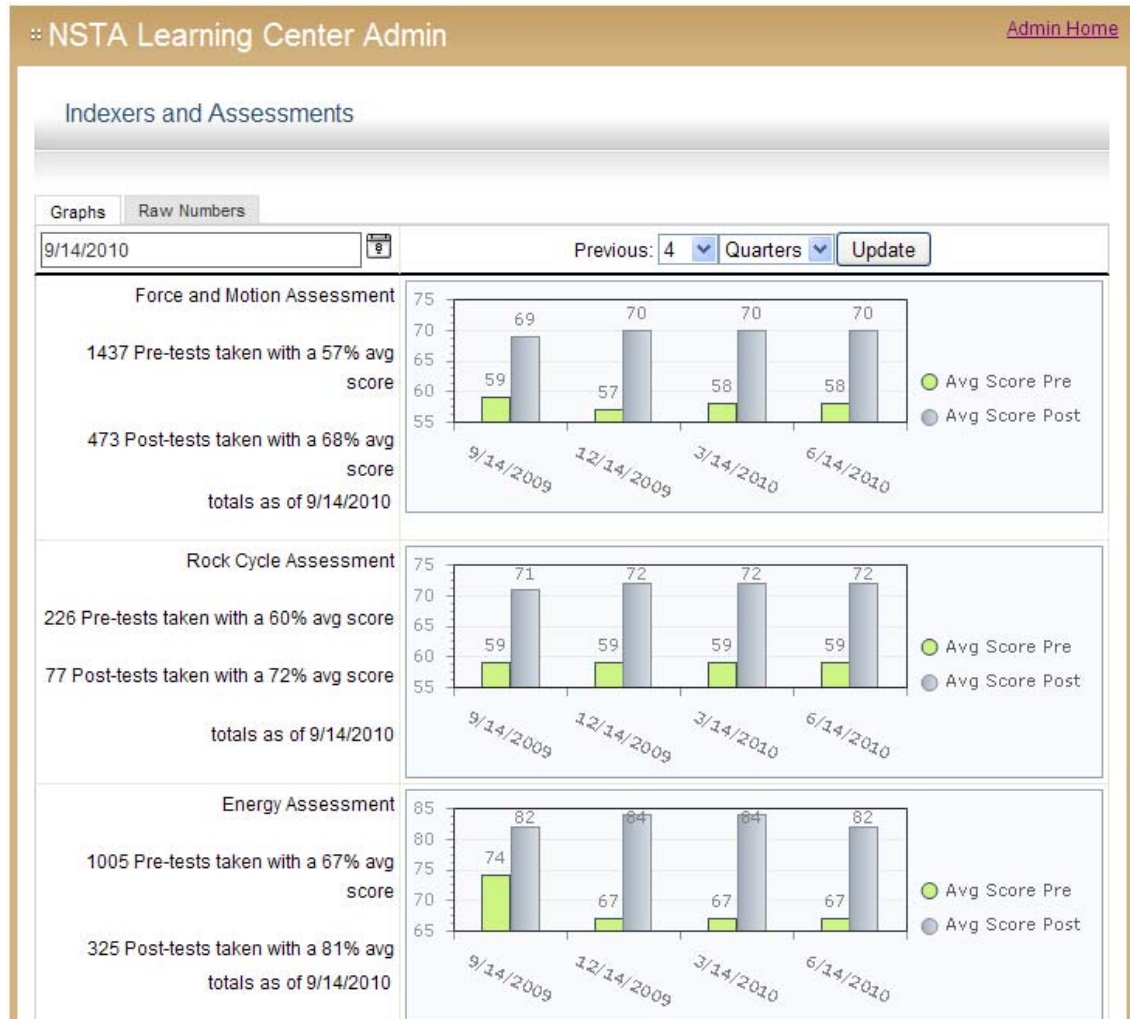
- Quantitative Descriptive Study (Correlation, Paired-Samples T Test, and Repeated Measures ANOVA using pretest-posttest, Likert Scale interaction preference survey and Kolb LSI 3.1)
- *85 teachers from grades 3-6* complete pre/post and final (Analysis across 7 different SciPacks)
- *Teachers' scored significantly higher on the posttest* (M=82.39, SD = 7.04) than the pretest (M= 61.31, SD, = 18.45), $t(101) = 11.63, p < .001$
- *Teachers' scored significantly higher on the final assessment* (M=79.14, SD = 12.91) than on the pretest (M=61, SD = 18.45, $t(101) = 10.84, p < .001$
- *Collectively, for 3 separate studies, this seems* to suggest when SciPacks are part of a blended PD solution **teachers demonstrate and retain significant gains in content knowledge**

The NSTA Learning Center

Research and Dissemination

NSTA captures pre- and post-assessment data to demonstrate learning gains by teachers as part of formal district and state deployments

Byers, A., Koba, S., Sherman, G., Schepke, J., & Bolus, R. (2011). Developing a web-based mechanism for assessing teacher science content knowledge. *Journal of Science Teacher Education*.





Wealth of Data for District and State Departments of Education

Customized Welcome Page: Unique page for each district, group, or administrator needs


My Learning Center

Welcome, Albert Byers :: [My Account](#) [Admin](#) [Logout](#)

Welcome | My Library | My PD Indexer | My PD Plan & Portfolio | My Transcript | My Calendar | My Notepad | Help Desk

Welcome CEMSS Participating Teachers,

Through your participation in the CEMSS, (*Collaborating for Excellence in Middle School Science*), you have access to a rich collection of science resources through the NSTA Learning Center at no charge to you.



LIVE SUPPORT ONLINE
Click here →

Required Baseline Assessments

In order to gain access to your professional development subscription resources and to measure their effectiveness, please take the short Pre-Assessment listed below: [Cell Structure and Function](#). You will be required to take a Post-Assessment at a later time. All results will be strictly confidential and only overall growth for the program will be tracked.

The list of "Other Available Assessments" will take you to Pre-Tests of other SciPacks. Please take the corresponding Pre-Test BEFORE you explore these SciPacks.

- [Cell Structure and Function Pre-Assessment](#)

Other Available Assessments

Force and Motion Post-Assessment

District Administrator Reports: PD Resource Preferences

Anaheim CEMSS 7th grade Admin Page

[My Account](#) [Admin](#) [Logout](#)

Welcome to your NSTA resource administrator page.

Data below is provided to assist you in tracking activity and progress of your program participants.

The URL for the Teacher Access Page is: <http://learningcenter.nsta.org/cemss-7>. The Promo Code is **cemss-7**

Overview

Individual Users

SciPack Summary

Manage Content

Calendar

Presentation Materials

Portfolios

Overview

Number of Licenses Purchased:	Number of Licenses Used:	% Used:
53	51	96%

Total Products Added by Type

Product Type:	Number Added:
Science Object	163
SciPack	146
Journal Article	133
SciGuide	45
Web Seminar Archive	28
Book Chapter	27

10 Most Recent Additions

User:	Title:	Type:	Date Added:
Jeff Cornelius	Science of Food Safety	SciPack	10/1/2009 2:22:20 PM
Jeff Cornelius	Cell Structure and Function: Cells – The Basis of Life	Science Object	9/30/2009 3:42:19 PM
Matt Bidwell	Science of Food Safety	SciPack	9/20/2009 4:31:41 PM

Web Accessible and Exportable Reports:

Product Usage, Pre/Post Assessments, Login history

Anaheim CEMSS 7th grade Admin Page

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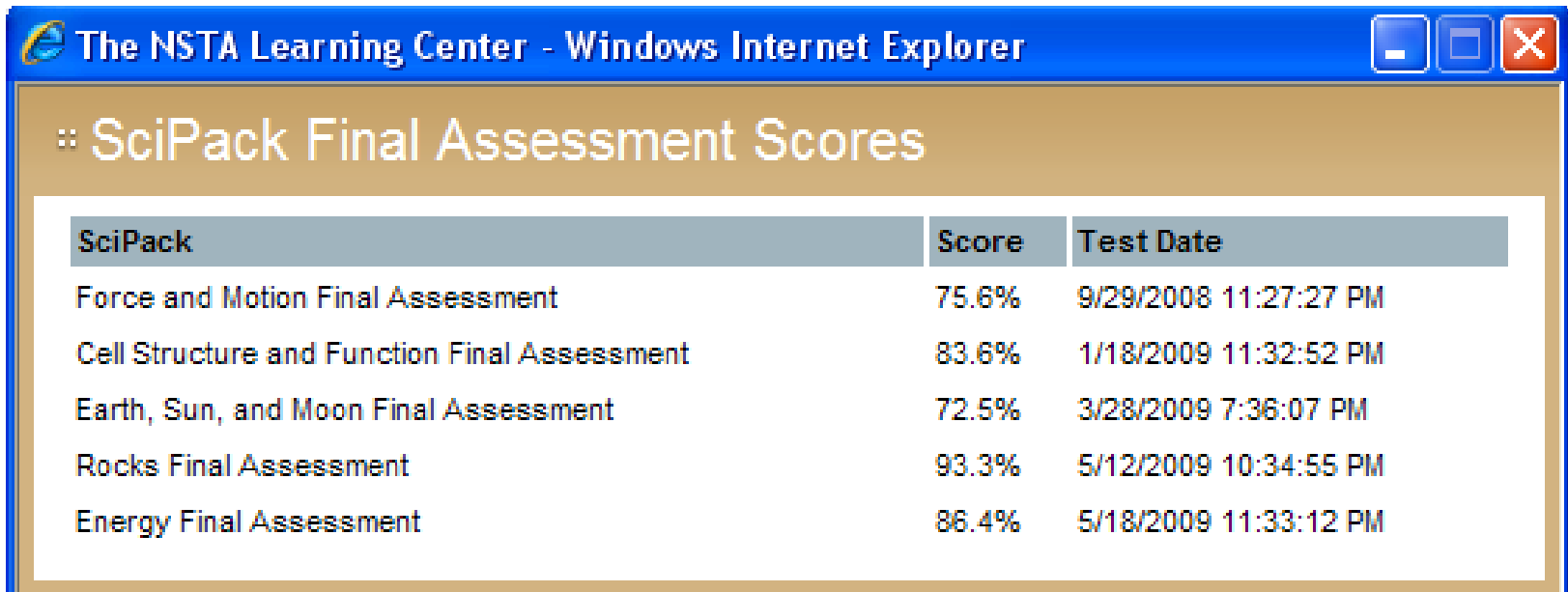
Individual Users

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

- [Export Pre/Post-Test Results \(sorted by SciPack\)](#)

User:	MemberID	Date Registered:	# of Products Added via Subscription:	Pre/Post Test Results
John Smyth	1296827	5/20/2009 4:33:00 PM	7	View Results
Betty Davis	1232605	5/20/2009 1:39:00 PM	24	View Results
Ron Smith	1550625	5/20/2009 1:44:00 PM	5	View Results
Samuel Adams	1469390	5/20/2009 4:46:00 PM	19	View Results

Final Assessment Score: Individual's SciPack status on final assessment at the end of each SciPack. Seventy percent needed to pass SciPack for certificate



The screenshot shows a browser window titled "The NSTA Learning Center - Windows Internet Explorer". The page content is titled "SciPack Final Assessment Scores" and displays a table with three columns: "SciPack", "Score", and "Test Date".

SciPack	Score	Test Date
Force and Motion Final Assessment	75.6%	9/29/2008 11:27:27 PM
Cell Structure and Function Final Assessment	83.6%	1/18/2009 11:32:52 PM
Earth, Sun, and Moon Final Assessment	72.5%	3/28/2009 7:36:07 PM
Rocks Final Assessment	93.3%	5/12/2009 10:34:55 PM
Energy Final Assessment	86.4%	5/18/2009 11:33:12 PM

SciPack Summary: Number of users per SciPack

Anaheim CEMSS 7th grade Admin Page

[My Account](#) [Admin](#) [Logout](#)

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The URL for the Teacher Access Page is: <http://learningcenter.nsta.org/cemss-7>. The Promo Code is **cemss-7**

Overview

Individual Users

SciPack Summary

Manage Content

Calendar

Presentation Materials

Portfolios

SciPack Summary

Click on a SciPack title to view all the people who've signed up for it.

Title:	# of Registered Users:
Cell Structure and Function	52
Coral Reef Ecosystems	12
Force and Motion	8
Nature of Light	8
Oceans Effect on Weather and Climate	12
Resources and Human Impact	11
Rock Cycle	6
Science of Food Safety	16

SciPack Detail: Individuals' status per each SciPack

Oregon Science Teachers Admin Page

[My Account](#) [Admin](#) [Logout](#)

Welcome to your NSTA resource administrator page.

Data below is provided to assist you in tracking activity and progress of your program participants.
The URL for the Teacher Access Page is: <http://learningcenter.nsta.org/ostp>. The Promo Code is **ostp2008**

Overview

Individual Users

SciPack Summary

Manage Content

Calendar

Presentation Materials

Portfolios

SciPack Detail for Cell Structure and Function

[<-- Back to SciPack list](#)

Currently displaying items: 1 - 10 of 28 1 2 3 Next View All

Name:

SciPack Final Assessment:

Blank = hasn't attempted
True = passed
False = attempted but hasn't yet passed

Activity Details:

Anna Bajorek

Energy: True
Rock Cycle: True
Force and Motion: True
Earth Sun and Moon: True
Food Science Safety: False
Cell Structure and Function: True

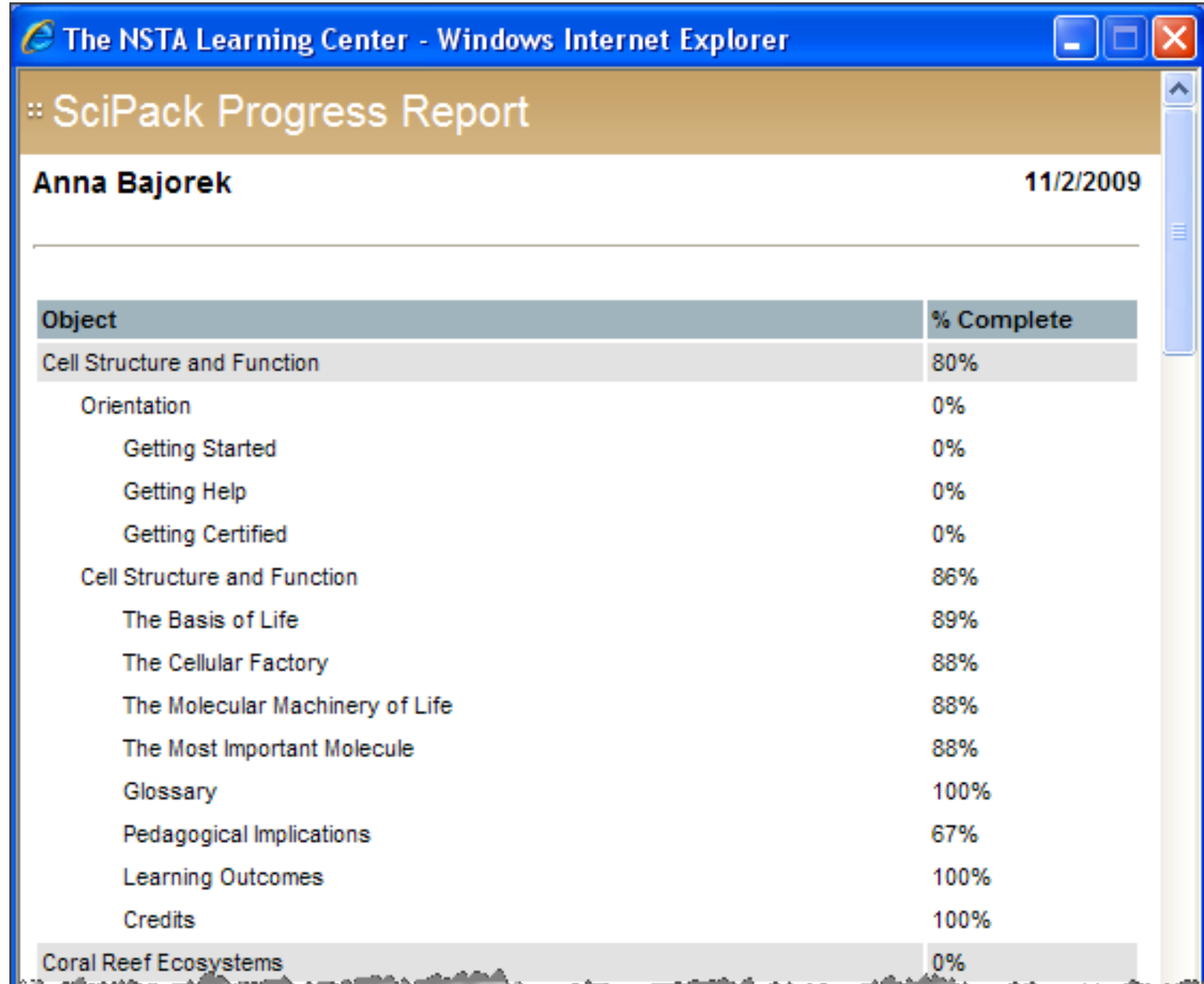
SciPack Progress Report
Access History
Final Assessment Scores

Lisa Bangert

Energy: True
Rock Cycle: True
Force and Motion: True
Gravity and Orbits: False
Earth Sun and Moon: True
Food Science Safety: True
Cell Structure and Function: True

SciPack Progress Report
Access History
Final Assessment Scores

Percentage of Completion: Individual's SciPack status



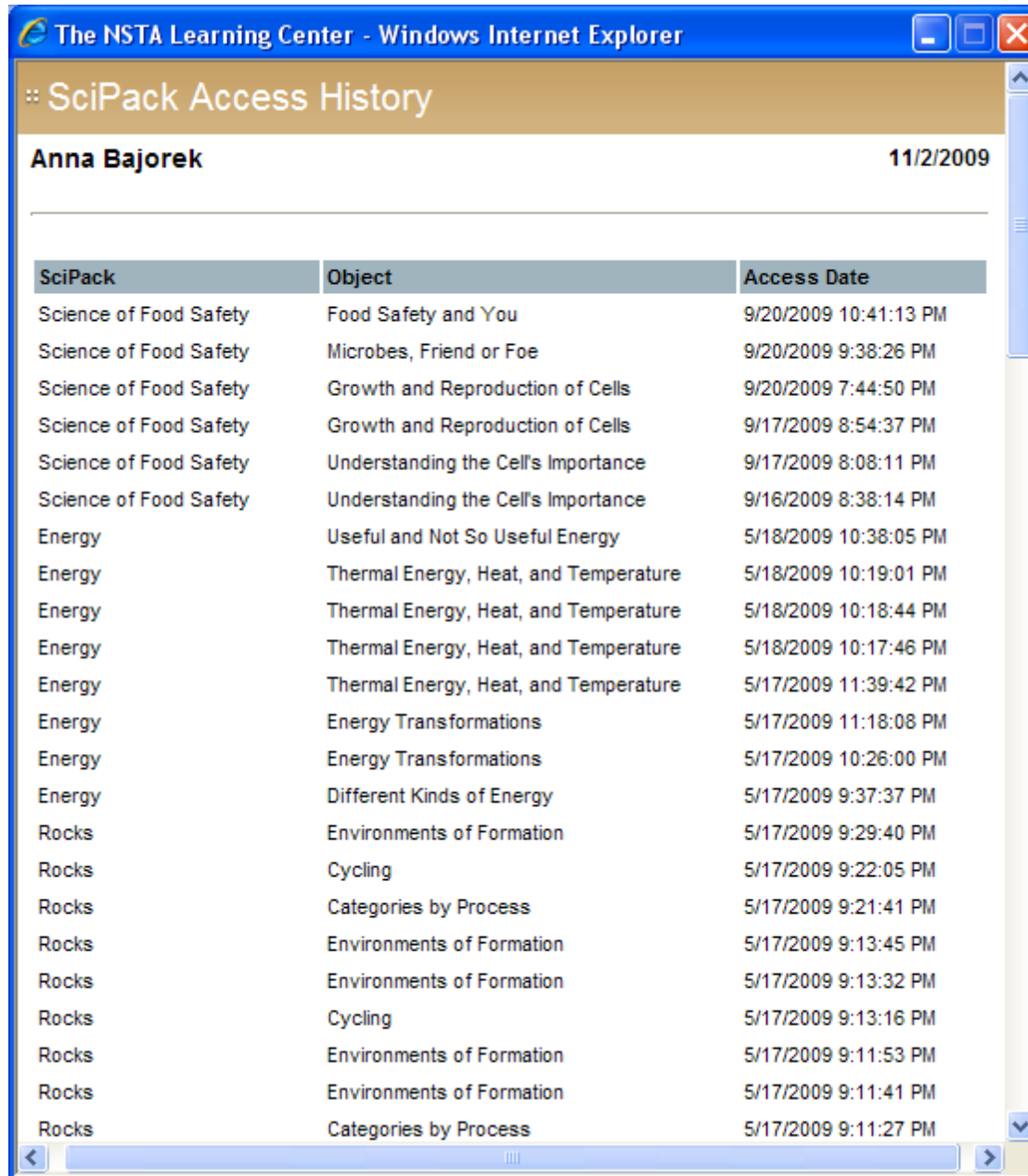
The NSTA Learning Center - Windows Internet Explorer

SciPack Progress Report

Anna Bajorek 11/2/2009

Object	% Complete
Cell Structure and Function	80%
Orientation	0%
Getting Started	0%
Getting Help	0%
Getting Certified	0%
Cell Structure and Function	86%
The Basis of Life	89%
The Cellular Factory	88%
The Molecular Machinery of Life	88%
The Most Important Molecule	88%
Glossary	100%
Pedagogical Implications	67%
Learning Outcomes	100%
Credits	100%
Coral Reef Ecosystems	0%

Access History: Individual's SciPack status on usage



The NSTA Learning Center - Windows Internet Explorer

SciPack Access History

Anna Bajorek 11/2/2009

SciPack	Object	Access Date
Science of Food Safety	Food Safety and You	9/20/2009 10:41:13 PM
Science of Food Safety	Microbes, Friend or Foe	9/20/2009 9:38:26 PM
Science of Food Safety	Growth and Reproduction of Cells	9/20/2009 7:44:50 PM
Science of Food Safety	Growth and Reproduction of Cells	9/17/2009 8:54:37 PM
Science of Food Safety	Understanding the Cell's Importance	9/17/2009 8:08:11 PM
Science of Food Safety	Understanding the Cell's Importance	9/16/2009 8:38:14 PM
Energy	Useful and Not So Useful Energy	5/18/2009 10:38:05 PM
Energy	Thermal Energy, Heat, and Temperature	5/18/2009 10:19:01 PM
Energy	Thermal Energy, Heat, and Temperature	5/18/2009 10:18:44 PM
Energy	Thermal Energy, Heat, and Temperature	5/18/2009 10:17:46 PM
Energy	Thermal Energy, Heat, and Temperature	5/17/2009 11:39:42 PM
Energy	Energy Transformations	5/17/2009 11:18:08 PM
Energy	Energy Transformations	5/17/2009 10:26:00 PM
Energy	Different Kinds of Energy	5/17/2009 9:37:37 PM
Rocks	Environments of Formation	5/17/2009 9:29:40 PM
Rocks	Cycling	5/17/2009 9:22:05 PM
Rocks	Categories by Process	5/17/2009 9:21:41 PM
Rocks	Environments of Formation	5/17/2009 9:13:45 PM
Rocks	Environments of Formation	5/17/2009 9:13:32 PM
Rocks	Cycling	5/17/2009 9:13:16 PM
Rocks	Environments of Formation	5/17/2009 9:11:53 PM
Rocks	Environments of Formation	5/17/2009 9:11:41 PM
Rocks	Categories by Process	5/17/2009 9:11:27 PM

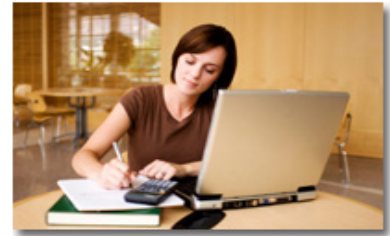
Learning Center Tools for Individual Teachers

PD Indexer

- Diagnose gaps in Content Knowledge Understanding
- View Recommended Resources and Opportunities for Consideration

PROFESSIONAL DEVELOPMENT INDEXER

The Professional Development Indexer helps you diagnose your needs in specific science content areas and provide suggestions of NSTA e-PD resources and opportunities you may want to consider as you plan your professional development (PD). The Indexer does not assign a grade or present a score to the questions you answer, but saves a list of recommended resources for later review.



You have two options for indexing your PD needs. First, you may review all of the content areas across any of the three science disciplines provided: physical, life, or earth and space science by clicking the "Diagnose All Subjects" button with a specific discipline. This will present you with five questions randomly selected from each content area for that discipline. Or, you may select one or more content areas within a discipline by checking the appropriate boxes and then selecting the "Diagnose Selected Subjects" button. This will present 10 questions from each science content area selected.

Earth and Space Science Indexer

Content Areas Covered:

- Rock Cycle
- Earth, Sun, and Moon
- Gravity and Orbits
- Solar System
- Plate Tectonics
- Universe
- Oceans Effect on Weather and Climate
- Earth's Changing Surface

Diagnose Selected Subjects

Diagnose All Subjects

Completed Indexes

Indexes in Progress

Completed Indexer Results

Rock Cycle, Earth...	Results 3/23/2007	Delete
Solar System, Pla...	Results 11/5/2008	Delete
Gravity and Orbit...	Results 11/17/2009	Delete
Solar System	Results 10/5/2009	Delete
Oceans Effect on ...	Results 11/21/2009	Delete

Hide Results

Life Science Indexer

Content Areas Covered:

- Cell Structure and Function
- Coral Reef Ecosystems
- Science of Food Safety

Completed Indexes

Indexes in Progress

Completed Indexer Results

Cell Structure an...	Results 9/11/2009	Delete
----------------------	-------------------	--------

:: PROFESSIONAL DEVELOPMENT INDEXER

Current Subject: Oceans Effect on Weather and Climate

Your Progress: 1 of 10

Calgary (Canada) is located at a latitude north of the equator similar to London (England), as indicated in the map above. However, the winter climate in Calgary is very different. Which of the following is part of an explanation for this difference?



- Warm Atlantic Ocean current transfer heat energy to regions surrounding London, resulting in more rainfall and cooler winter temperatures.
- Calgary is surrounded by large land masses that do not retain heat as readily as large masses of water, keeping inland temperatures cooler during winter months.
- London is closer to large, cold bodies of water that keep temperatures cooler during the winter months.

Submit Answer

:: PROFESSIONAL DEVELOPMENT INDEXER

Category: Earth and Space Science Indexer

Date: 11/21/2009

⌵ About Your Feedback

Oceans Effect on Weather and Climate

Your score: **4** out of **10** correct



- [Recommended Resources](#)
- [All Resources for this Subject](#)

Content Knowledge Assessment: Sample Chronbach α Internal Consistency

Pre and Postassesment	No. of Items	No. of Cases	Internal Consistency*
Earth History	20	111	.704
Magnetic and Electric Forces	22	114	.821
Nature of Light	20	105	.737
Atomic Structure	16	102	.882
Cell Structure and Function	23	261	.636
Chemical Reactions	23	101	.877
Elements, Atoms, & Molecules	28	103	.812
Cell Division & Differentiation	22	97	.752
Cells & Chemical Reactions	24	94	.821
Force and Motion	25	220	.816
Energy	20	227	.759
Solar System	20	238	.695
Plate Tectonics	20	216	.790

Byers, A., Koba, S., Sherman, G., Schepcke, J., & Bolus, R. (2011). Developing a web-based mechanism for assessing teacher science content knowledge. *Journal of Science Teacher Education*.

PROFESSIONAL DEVELOPMENT INDEXER

Category: Earth and Space Science Indexer

Date: 11/21/2009

↓ About Your Feedback

↓ Collapse All Recommended Resources

Oceans Effect on Weather and Climate

Your score: 4 out of 10 correct

Close Resources

All Resources for this Subject

Oceans Effect on Weather and Climate



Archive: Polar Science, Global Discoveries: IPY
Research Update for Teachers, May 22, 2008

Web Seminar Archive

Add to PD Plan

This Web Seminar, sponsored by the National Science Foundation, NOAA, and NASA, took place on May 22, 2008, from 6:30 p.m. to 8:00 p.m.

Eastern Time. Presenting was Dr. Mary Albert, Senior Research Engineer at the U.S. Army Cold Regions Research and Engineering

Member Price: Nonmember Price: Free

Free

Grade Level: Elementary School, Middle School



Oceans Effect on Weather and Climate: Changing Climate

Science Object

Add to PD Plan

Science Objects are two hour on-line interactive inquiry-based content modules that help teachers better understand the science content they teach. This Science Object is the fourth of four Science Objects in the Ocean's Effect on Weather and Climate

Member Price: Nonmember Price: Free

Free

Grade Level: Elementary School, Middle School, High School

NSTA Content Assessment Item Development Process

Stage 1: Item Development (Appendix B)

- Step 1-Identify and train item developers
- Step 2-Item developers generate items based on web module evidences of understanding
- Step 3-Items submitted to subject matter experts
- Step 4-Items edited by assessment expert

Stage 2: Pilot Testing

- Step 5-Prepare items for online pilot testing and recruit pilot testers
- Step 6-Collect pilot data and analyze pilot results (point biserial item analysis)

Stage 3-Final Item Selection

- Step 7-Item reviewers evaluate pilot data (two reviewers per set)
- Step 8-Item review team evaluates items for bias & content alignment with stated evidences of understanding
- Step 9-Select final items based on item reviewer recommendations
- Step 10-Test-level analysis on selected items conducted (Chron. Alpha)

Stage 4-Final Item Preparation

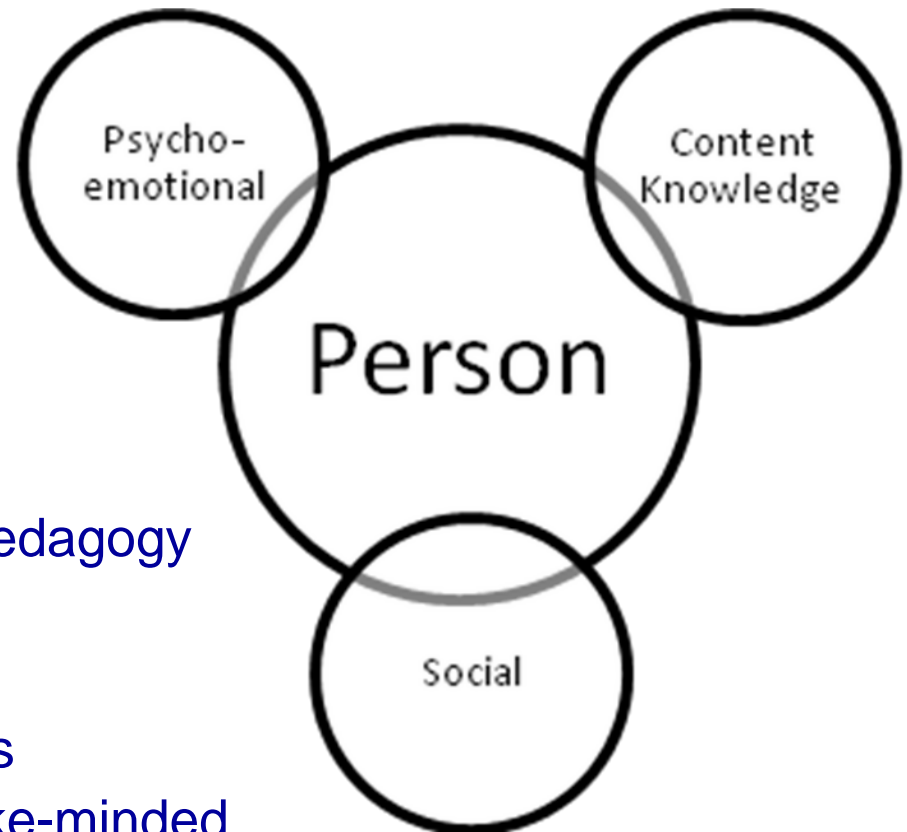
- Step 11-Clean up graphics and edit copy

Learning Center **Community**

(forthcoming)

Learning Center Community

- Person at center of online experience, not the product
- Three primary “strategies”
 - **Psycho-emotional roles**
 - recognition
 - self-actualization
 - coaching/mentoring
 - **Content Knowledge**
 - compelling & valuable to learner (teacher)
 - subject matter, PCK & pedagogy
 - **Social Engagement**
 - personal aspect
 - extended connectedness
 - worthwhile dialog with like-minded colleagues and access to experts



Live Support

Back to NSTA.org Contact Us Help Feedback

The NSTA Learning Center

Search the Learning Center

FDA Sci Home My Account Subjects Learning Resources & Opportunities Professional Development Tools Education Administrator

My Learning Center

Welcome, Isabelle [Log Out](#)

Welcome My Library My PD Indexer My PD Plan & Portfolio My Transcript My Calendar My Notepad Help Desk

Welcome Members of FDA's Teachers Academy for Food Science!

Through your participation in this program you have access to a rich collection of resources at no charge to you.

Your Learning Center subscription provides unlimited access to the complete library of:

- [NSTA SciPacks](#)
- [NSTA Science Objects](#)
- [NSTA SciGuides](#)
- [NSTA Journal Articles](#)
- [NSTA Web Seminar Archives](#)
- [NSTA Podcasts](#)

Required Baseline Assessments

In order to gain access to your professional development subscription resources and to measure their effectiveness, please take the **Science of Food Safety Pre-Assessment** linked below. All results will be strictly confidential and only overall growth for the program will be reported.

- [Science of Food Safety Pre-Assessment](#)

Other Available Assessments

Nutrition Pre-Assessment

Explore Learning Opportunities [See all FREE Lesson Plans](#) [See all FREE Resources](#)

Growing in the Right Direction!

See what other teachers and administrators are saying

LIVE SUPPORT ONLINE

Click here →

- One-on-one live chat with Online Advisor
- Online Advisors can help teachers identify e-PD resources and opportunities

Learning Center Online Advisors

- 30 educators provide support
- live and asynchronous
- 7 days/week; ~60 hours/week

Wendy Ruchti

Wendy Ruchti has been part of the Educational Foundations Department at Idaho State University's College of Education since 2008. She received a PhD in Education from the University of Idaho in 2005 with an emphasis in curriculum and instruction in STEM education. At ISU, she has taught several educational foundations courses. Her research interests include elementary science education and creating collaborative online learning environments. Before coming to ISU, she taught middle school science and math.



Lara Smetana

Lara Smetana is an assistant professor of science education at Southern Connecticut State University. She brings classroom experience as an 8th grade physical science teacher and has worked with a variety of informal education programs across the country. Lara teaches courses in elementary science methods and educational technology and mentors student teachers. Her research interests include pre- and in-service teacher education and the use of educational technology in science teaching and learning.



Kathy Sparrow

Dr. Kathy Sparrow is currently an adjunct professor at Florida International University (FIU), teaching Elementary Science Methods. She previously worked as a middle and high school science teacher as well as the Science Supervisor for Akron Public Schools. She was a Regional Director for SECO, served on the NSTA Board of Directors and was president of the National Science Education Leadership Association (NSELA). Kathy was also awarded the Outstanding National Science Supervisor Award in 1999.

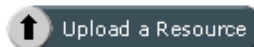


Welcome to your collection of professional development resources. Select from the links and tabs below to access your NSTA resources, your uploaded items, organize them into collections, and then share your collections with others.

[NSTA Resources](#)[My Uploaded Resources](#)[Resource Collections](#)[Collections Shared With Me](#)

Resource Upload

New to the Learning Center! Enjoy the convenience of having all your electronic resources in one location. Upload up to 1.5 GB of your resources to your Learning Center library, add them to your collections, create notes about them, and e-mail them to your friends. File formats include PowerPoint presentations, Word documents, Excel spreadsheets, PDF files, image files, and more. Each file must be 10 MB in size or smaller. Please read the [Terms and Conditions](#)



You are currently using **0.0%** of your **1.5 GB**





You have **1.50 GB** of available space

My Uploaded Resources



[Ice Climbing.jpg](#)





Image from NASA education professional development experience at Lake Placid, NY. Climbing ice wall

-  [Email to a Friend](#)
-  [Add to Collection](#)
-  [Create Note](#)
-  [Delete this Resource](#)



[Exploring Tides Simulation \(Explore Learning\)](#)





Gain an understanding of high, low, spring, and neap tides on Earth by observing the tidal heights and the positions of the Earth, Moon, and Sun. Tidal bulges can be observed from space, and water depths can be recorded from a dock by the ocean.

-  [Email to a Friend](#)
-  [Modify Collections](#)
-  [Create Note](#)
-  [Delete this Resource](#)



[Seasonal Weather Temperatures.xls](#)





Small data set of real-world authentic data for students to analyze for seasonal variation and patterns in temperature

-  [Email to a Friend](#)
-  [Add to Collection](#)
-  [Create Note](#)
-  [Delete this Resource](#)



[DistrictPersonal Lesson Plan.doc](#)





Lesson plan shared between school district aligned with curriculum and unit on weather

-  [Email to a Friend](#)
-  [Add to Collection](#)
-  [Create Note](#)
-  [Delete this Resource](#)



[NASA Satellite Visualizations of Sea Surface Temperatures.ppt](#)

Visualizations help scientists predict El Nino cyclical weather events

-  [Email to a Friend](#)
-  [Add to Collection](#)
-  [Create Note](#)
-  [Delete this Resource](#)

My Library: Resource

Welcome, Albert  [View Cart](#) | [Admin](#) | [Log Out](#)

Welcome to your collection of professional and tabs below to access your NSTA resources, and then share your collection.

Collections enable you to group together and organize your resources. You may also share collections with friends and colleagues.

Select from the links



LIVE SUPPORT ONLINE
Click here 

My NSTA Resources

My Uploaded Resources

My Resource Collections

Collections enable you to group together and organize your NSTA resources. You may also share collections with friends and colleagues.

To create a new collection:

- Click "Start a New Collection" below; fill in the brief form and click "Submit"
- Choose items from [your library](#), our [resource search page](#), or [upload your own files](#) to add to the collection
- NOTE: NSTA resources must first be added to your library before they can be added to a collection**
- For more help view the [My Library Help Guide](#) (1.24 MB PDF) to see screen shots and step-by-step instructions









My Collections



Collections Shared With Me

[Start a New Collection](#)

Title	Created	Title	Shared by	Shared
 Assessment 2 items	3/17/2008	 Assessment 2 items	Mike Smith	10/5/2009
 Atomic Structure 1 items	10/1/2009	 Earth Day PD Resources for Teachers of Science 9 items	The Learning Center	4/12/2010
 Catpillars 4 items	9/15/2010	 Earth Sun and Moon 10 items	Sue Leelan	4/2/2010

Welcome to your collection of professional development resources. Select from the links and tabs below to access your NSTA resources, your uploaded items, organize them into collections, and then share your collections with others.



- My NSTA Resources
- My Uploaded Resources
- My Resource Collections

Assessment

One of the biggest challenges to the more widespread use of inquiry is the difficulty teachers have in identifying appropriate activities.

Intended for: Elementary, Middle school

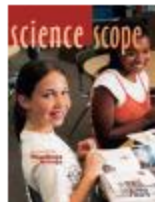
- [Share this Collection](#)
- [Make this Collection Public](#)

- [Back to All Collections](#)
- [Edit Collection Name/Description](#)
- [Delete Collection](#)

Sharing Resources

Currently displaying items: 1 - 2 of 2

Sort By:



A Rubric for Selecting Inquiry-Based Activities

Type: Journal Article

Days Remaining: Unlimited

Grade: Middle School

Summary: One of the biggest challenges to the more widespread use of inquiry is the difficulty teachers have in identifying appropriate activities. Teachers can structure the use of inquiry in the classroom with this rubric based on the *National Science Education...*

- [Email to a Friend](#)
- [Modify Collections](#)
- [View/Edit Notes](#)
- [Write Review](#)
- [Remove From Collection](#)



Assessing Student Presentations From Three Perspectives

Type: Journal Article

Days Remaining: Unlimited

Grade: Middle School

Summary: Analyzing student presentations from three perspectives—expert, peer, and self—provides extended feedback and opportunities to learn. All three of these are helpful and serve different purposes. The expert (teacher) feedback shows how the teacher views...

- [Email to a Friend](#)
- [Modify Collections](#)
- [Create Note](#)
- [Write Review](#)
- [Remove From Collection](#)

Over 336 collections already publicly shared in first month of release

Discussion Forums (*asynchronous*)

- Four public forums
- Content, pedagogy, & resources
- In-depth discussions
- Online Advisors

:: Discussion Forums

Below are group forums that you may join. Post to existing topics or start your own! All NSTA resources, personally uploaded resources, and collections may be shared and commented upon within these discussions.



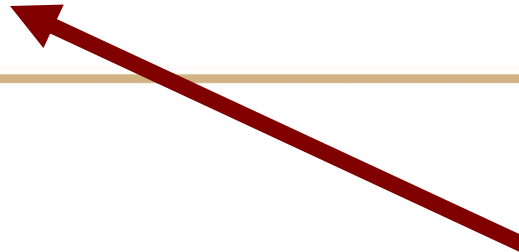
2 people currently browsing this forum

Public Forums

Forum		Last Post
 Life Science A public forum.	2 Topics 14 Posts	by Learning Center Online Advisors Yesterday, 7:17 PM New Biology SciPacks, Resources?
 Physical Science A public forum.	4 Topics 21 Posts	by Adah Stock Yesterday, 9:48 AM Low Cost Chemistry Labs
 Earth and Space Science A public forum.	6 Topics 28 Posts	by Alyce Dalzell Yesterday, 12:02 PM Earth Science Week & FREE Ideas
 General Science A public forum.	9 Topics 41 Posts	by Pamela Auburn Today, 1:56 PM Improving Low-Performance Schools

Who is Online

[Carolyn Mohr](#), [Greg Sherman](#)



Discussion Forums

- Linked to User Profile
- Display Recognition Badges
- Integrates content
- Shows number of posts
- Will show “activity” bar in community

NSTA Learning Center Discussion

[Home](#) > [Discussion Group Three - Week One](#) > [Task 1: Learning Center Collection](#)

1 person currently browsing this forum

[POST REPLY](#)

[WATCH THIS TOPIC](#)



by [Walter Woolbaugh](#), Fri Aug 27, 2010 2:39 PM

Hi:

In order to begin understanding the Learning Center collection system, we'd like you to begin your collection with at least three items from the Learning Center. First, on the Learning Center page click on the tab that says "My Account." You might explore what each of the tabs under this are all about. Then you might click on "My Library," and begin to explore this idea of collections. As we've been doing, open up each of the tabs so you can become familiar with them (you can do this process with all the tabs in the Learning Center). You might take a look through the various items that we've just explored and see which ones might best suit your needs in terms of adding to your own collection. Once you have at least three items, please share in this thread what you have listed in your collection, and why you included these particular items. Thanks for doing this.

Your final step will be to share this collection with me (walter@montana.com - just hit the "share" button and select "email.") Also please leave the box checked



[Walter Woolbaugh](#)

Posts: 202

[REPORT](#)

by [Patricia McGinnis](#), Sat Aug 28, 2010 10:52 AM

Subject: Patty McGinnis' Collection

I will be working with gifted students this year as a gifted resource specialist so I have started my collection with items that I can use with the gifted students. I have selected 3 articles from NSTA journals and 3 archived webinars about science competitions like Exploravision. Normally teachers don't have time in the curriculum to conduct competitions. It is my hope that I can build a program that would include all sorts of challenging activities for students, including science competitions.



[Patricia McGinnis](#)



Learning Center Activity Points:



Posts: 28

[REPORT](#)

by [Patricia Rourke](#), Mon Aug 30, 2010 11:43 AM

This will be interesting since I just went in and copied my current Library Profile and attached it below. I will take the time to explore NSTA Resources with new eyes looking for items that may be useful to us as on-line advisors. As I scanned the posts prior to this one, and I am sure those that will follow, I know that there will be additional areas selected by you that I will want to explore also. My current profile reflects my recent collaboration with NSTA.

Attachments

[PAR Library Profile Aug 30.jpg](#) (0.07 MB)



[Patricia Rourke](#)



Learning Center Activity Points:



Posts: 55

[REPORT](#)

User Profile

- Learn about others in community
- Badges and points awarded for community building activities:
 - Comment
 - Aggregate
 - Advocate
 - Disseminate

Learning Center Profile



Patricia Rourke

[310 Activity Points](#)

Affiliation: Science Technology Consultant

Location: Arlington, VA and Cape May Point, NJ

Badges:



- Aggregator:** Add personal resources to your library
- Disseminator:** Share your resource collections
- Advocator:** Review and rate resources
- Commenter:** Post in the Discussion Forums

Badges Yet to be Earned

[Visit the activities page](#) to learn how you can earn points and badges. The NSTA Learning center awards badges based on activities performed within the website. Pursuing badges is a great way to explore all the resources and professional development tools the Learning Center has to offer.



Contact

IM: Patty Rourke

Statistics

Joined: Tue Nov 29, 2005 11:01 AM

Last Visited: Yesterday, 9:06 PM

Total Posts: 96

Recent Posts

Yesterday, 8:11 PM in [Atomic Theory Resources](#)

Kuddos to Adah for pointing us to the Atomic Structure SciPack and its concomitant free Science Objects. I'll go outside the LC for now and mention the great simulations developed by educators and vetted by classroom teachers. They are free and available from PhET. Some of them are also referenced in SciPacks and other LC resources. Here is the url for the one on Build an Atom

[View Full Post](#)

Incentivized Badges with Recognition Earn as you Learn...and then Donate!



Physical Science Indexer

Help rescue the reef by completing the Physical Science indexer.
Level xp: 250



Aggregator (Sapphire)

Donate a pound of produce by adding 30 personal resources to your Library. Level xp: 300



NSTA Resource Optimizer

Donate a book with 99 others adding 10 NSTA resources to your Library. Level xp: 100



Advocator (Ruby)

Give a day's worth of food by writing 40 reviews. Level xp: 800



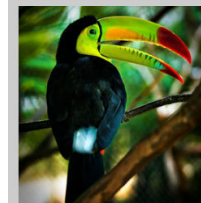
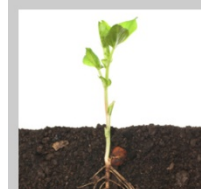
Commenter (Diamond)

Plant a food seed by making 100 posts onto the Message board. Level xp: 1,000



Disseminator (Onyx)

Preserve 10 square feet of the Osa Peninsula Rainforest by sharing a collection with 1 person. Level xp: 10



2010 National Education Technology Plan

US Department of Education (2010). *Transforming American education: Powered by Technology*. Washington, DC: Office of Educational Technology.

Through online learning systems, teachers may enhance their learning through **blending the best of onsite PD with online PD** that provides **immediacy, convenience, self-direction, and collaboration** with other colleagues and experts via professional learning communities. For teachers to effectively facilitate using interactive resources, learning systems, and connectedness to online communities, **teachers need to experience it firsthand as part of their own learning and professional development.**

The NSTA Learning Center

Preservice Science Method Professor Testimonials

I am writing to praise NSTA for your creative efforts in providing online professional development resources for teachers and to let you know that at **The University of Maryland, Baltimore Campus** we are using the resources with our pre-service elementary science teachers to boost their content understandings and help them gain insights into high quality professional development. As the professor of the UMBC elementary science methods course and as a professional development researcher, my belief is that the day you decide to become a science teacher you start on your professional development journey. So, one of the main goals in my course is to help my pre-service teachers become aware of the resources that will serve them across their careers as life-long learners. **The online professional development resources on the NSTA website are a perfect fit** for helping us reach this goal. 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 are the types of activities they will be doing as practicing science teacher

UMBC

Susan M. Blunck, Ph.D.
Associate Clinical Professor
Science Education
Director UMBC Center for
Excellence in STEM Education

The NSTA Learning Center

Preservice Science Method Professor Testimonials

I utilize the NSTA Learning Center for my Pre-service Teachers enrolled in my science methods courses at The University of Texas-Tyler. **I utilize the Learning Center because it is much more comprehensive than a methods text. The NSTA Learning Center allows me to develop (preload) a library of materials I can share with my students to serve as their text.** It allows the students to build upon the library by adding their own resources as they learn about science teaching and learning. In the EC-6 and 4-8 grade level certification programs too many students do not have the content backgrounds they need in science. **The Learning Center allows me to evaluate my students' science content knowledge using the free PD Indexer tool and develop a remediation plan using SciPacks to address their gaps in knowledge.** The best part is that students complete the modules outside of class rather than taking limited class time. Students also seem to like the SciGuides that are coupled with the SciPacks and Science Objects, as they provide vetted web-based resources, lesson plans, and access to the simulations found in the SciPacks for use in the classroom.



Michael Odell, Ph.D.
Roosth Chair in Education
Executive Director, The
Ingenuity Center
University of Texas at Tyler

The NSTA Learning Center

Inservice District Science Specialist Testimonials

The NSTA Learning Center is an outstanding resource that has proven to be invaluable to our teachers! We have utilized this resource for both beginning teachers as well as more experienced teachers. All of our teachers have found this to be a convenient way to enhance their science content knowledge, an invaluable resource to assist in explaining specific concepts in class, a useful tool for sharing resources with colleagues, and a central location for compiling their lesson plans, examples of student work, and annual progress. The assistance provided in getting started and training teachers how to use the Learning Center is outstanding. Once established, the help and support for the Learning Center is also outstanding. All of the Help Desk staff has been extremely helpful, providing the highest level of service achievable! Once teachers experience the online learning and utilize the extensive resources available, they never want to stop using the NSTA Learning Center! I highly recommend it!



Marguerite A. Sognier, Ph.D.
Director, Educational Outreach
Texas Regional Collaborative,
Galveston , TX

The NSTA Learning Center

Inservice District Science Specialists Testimonials

The goal of the Teacher Academy in the Natural Sciences (TANS) project is to enrich the science content of Mississippi's middle school science teachers. To accomplish this goal, **the TANS leadership team at Mississippi State University (MSU) relies on the over 5,000 resources in the NSTA Learning Center throughout the academic year to extend and enhance our TANS summer institute content instruction.** SciPacks are in-depth online science modules that our participating teachers can access and complete at their convenience. With an assortment of SciPack topics available, the TANS leadership team was able to choose appropriate and relevant modules in chemistry, physics, and the geosciences. **Not only does the NSTA Learning Center provide a multitude of convenient online resources, but the support provided by the NSTA Learning Center team is superb.** The NSTA Learning Center is an integral component of the Teacher Academy in the Natural Sciences Mississippi Mathematics-Science Partnership at MSU. We look forward to working closely with the NSTA Learning Center over the next three years



Renee Clary, Ph.D.
Director, Teacher Academy
Mississippi State Mathematics-
Science Partnerships
Mississippi State University

The NSTA Learning Center

Awards



2009 Golden Lamp Awards Finalist
Category: Professional Development.
The Association of Educational Publishers



2007 Learning Leader:
Organizational Management
Excellence for The NSTA Learning
Center. Bersin & Associates, 2007



2007 Learning Content Management
Project of the Year: The NSTA Learning
Center, Training Magazine, 2007