



*This research resource is from NSTA through its NCSE-2009. Congress is set up to allow leaders with their own diverse ideas from chapters across the country to explore specific issues to suggest directions that NSTA can hear and act upon. The model could be an excellent set of ideas for ISTA leaders to study and replicate in your own settings. Best wishes for your utility of this resource. GP, ISTA President*

## **ISSUE FORUM 1: RESOURCES FOR RETAINING TEACHERS**

### **Abstract:**

Placement and retention of quality teachers in the classroom are essential in preparing students to be competitive and productive in today's modern, global society. There are capable, potentially effective people who can fill that need but are not drawn to the profession or who become dissatisfied and leave. This issue extends from pre-service throughout all experience levels. The focus of this issues forum will be to examine and identify effective ways to address the resource component of the "Three R's" of Teacher Retention.

### **Guiding Questions**

1. How can we identify resources that teachers can use on a classroom level?
2. What are some ways to increase teacher pay?
3. How can teachers find out about grant sources?
4. How can community and business support be developed?
5. What are some alternatives when you don't have the materials you need?

### **Resources:**

Behlmann, Emily. *Teacher Pay at Issue in Report*. <http://www.gctelegram.com/News/Teacher-compensation-9-16-08>

Christian Science Monitor. Change pay, change teaching? <http://www.csmonitor.com/2009/0318/p01s02-ussc.html>.

Community Resources for Science. [www.crsce.org/pdf/newsletter\\_spring\\_05.pdf](http://www.crsce.org/pdf/newsletter_spring_05.pdf)

Hess, Frederick. Teacher Quality, Teacher Pay. <http://www.hoover.org/publications/policyreview/3438676.html>

Resources for Teaching Science. National Science Digital Library. <http://www.leasttern.com/teacher/science.html>

### **Other References:**

Free Federal Resources for Educational Excellence, [http://free.ed.gov/subjects.cfm?subject\\_id=41](http://free.ed.gov/subjects.cfm?subject_id=41).

Free Stuff for Science Teachers. <http://scienceinquirer.wikispaces.com/freestuff>

Graziano, Claudia. School's Out: Crisis in Teacher Retention. *Edutopia*, Feb. 2005. <http://www.edutopia.org/schools-out>

Hassel, Brian. *Better Pay for Better Teaching*. [http://www.ppionline.org/ppi\\_ci.cfm?knlgAreaID=110&subsecID=135&contentID=250543](http://www.ppionline.org/ppi_ci.cfm?knlgAreaID=110&subsecID=135&contentID=250543)

Philanthropy News Digest, February 28, 2009. <http://foundationcenter.org/pnd/news/story.jhtml?id=244700012>

US Government grants <http://grants.gov>

NSTA Professional Development pages <http://www.nsta.org/pd/?lid=tnavhp>

NSTA Science Trade Books <http://www.nsta.org/publications/ostb>

Ohio Resource Center website has professional development, standards based lesson plans and more. Are there similar organizations in other states? <http://www.ohiorc.org>

Ingersoll, Richard M. 2003. Turnover and Shortage Among Science and Mathematics Teachers in the United States.

K-12 Science Ed. Resources. <http://www.eskimo.com/~billb/edu.html>

Kim's Korner for Teacher Talk. <http://www.eskimo.com/~billb/edu.html>  
NSTA Learning Center. <http://learningcenter.nsta.org/>  
Rhoton, J and Bowers, P., Eds. *Science Teacher Retention: Mentoring and Renewal*. (Issues in Science Education) Arlington, VA. National Science Education Leadership Association and NSTA Press. [NSTA Stock Number: PB127X4]  
Salzar, James. *Perdue Plan: Merit Pay for Teachers*.  
<http://www.ajc.com/services/content/printedition/2009/01/14/legeggs.html>  
*Teacher Explorer & Guide for Science Teachers & Students, ELibary Curriculum Edition*.  
[www.proquestk12.com/productinfo/pdfs/eLibCE\\_Sci\\_Teacher\\_Explorer.pdf](http://www.proquestk12.com/productinfo/pdfs/eLibCE_Sci_Teacher_Explorer.pdf)  
Teacher Freebies. [http://freebies.about.com/od/teacherfreebies/Teacher\\_Freebies.htm](http://freebies.about.com/od/teacherfreebies/Teacher_Freebies.htm)

## **ISSUE FORUM 2: SUPPORTING SCIENCE LEADERS**

### **Abstract:**

The data about the retention of teachers of science are alarming. As we think about the career path of teachers of science, we cannot help but wonder what factors sustain them throughout their tenure. Evidence suggests that when teachers perceive support and the potential for role expansion opportunities, they are more likely to remain in the profession. The focus of this session will be to explore the key components of developing and sustaining science leaders and the role that those components may have in retaining teachers of science in their career path.

### **Guiding Questions and Issues to Consider:**

1. How can opportunities to serve in leadership roles enhance science teachers' tendency to stay in the profession?
2. What system (school, district, state, professional association) structures need to be in place to support science leaders?
3. What leadership roles are available for teachers of science?
4. Where does leadership fit into the professional growth continuum?
5. What does research say about role expansion and teacher retention?

### **Resources:**

Teacher Learning and Professional Growth (<http://www.susanneowen.hostrocket.com/>)  
Is There Really a Teacher Shortage? By Richard M. Ingersoll University of Penn, September, 2003. A Research Report Co-sponsored by The Consortium for Policy Research in Education and The Center for the Study of Teaching and Policy  
([http://repository.upenn.edu/gse\\_pubs/133/](http://repository.upenn.edu/gse_pubs/133/))  
Teacher Leadership as Classroom Support: The Challenges of Scale and Feedback in Mathematics and Science Education Reform (<http://cllc.edc.org/Papers>)  
Short on Power, Long on Responsibility, September, 2007 Educational Leadership,  
(<http://www.gse.upenn.edu/pdf/rmi/EL-RMI-2007.pdf>)

### **Other References:**

Feiman-Nemser, S. (2001) From preparation to practice: Designing a continuum to strengthen and sustain teaching, *The Teachers College Record*, 103, (6), December 2001, pp. 1013-1055(43), Blackwell Publishing  
Huberman, M. (1992). Teacher development and instructional mastery. In M. Hargreaves & M. Fullan (ed). *Understanding Teacher Development*, New York: Teachers College Press.  
Ingersoll, R. (2001). Teacher turnover and teacher shortages. *American Educational Research Journal*, 38 (3), 499-534.  
A brief article addressing key considerations when planning professional development, including that in support of leaders.  
<http://www.teachersourcebook.org/tsb/articles/2009/03/16/02fisher.h02.html>

### **ISSUE FORUM 3: MEETING THE NEEDS OF DIVERSE LEARNERS**

#### **Abstract:**

American education is facing the greatest diversity it has ever known. New demands and challenges have been created from a changing America. Our schools and workplaces have already been changed dramatically. Educators in America need to work at recognizing the wide range of intellectual and communicative practices from which children of diverse backgrounds carry on their lives. Research shows us that diverse people learn in many different ways. Educators need to keep in mind that students learn at the highest level when they receive instruction according to the type of intelligence that the student has had created within them. American educators need to consider that diverse learners can educate their classmates as well as learn from them. Educating every student is the best thing we can do, it is the moral thing to do. We have moved on from trying to justify inequalities in learning for all in our classrooms.

#### **Guiding Questions and Issues to Consider:**

1. What is our stance on a teacher's teaching and a student's learning as far as diversity is concerned?
2. What can diverse learners teach the educator and fellow students?
3. What dilemmas do science educators face while educating diverse learners?
4. What educational tools are available for diverse learners other than textbook based teacher directed approaches that do not align well with research based design features.

#### **Resources:**

1. Science Educational Tools for Diverse Learners  
[www.successfulschools.org/documents/BigIdeasScience.pdf](http://www.successfulschools.org/documents/BigIdeasScience.pdf)
2. Science Diverse Learners Research Reviews  
[www.iowa.gov/educate/prodev/science\\_dl.html](http://www.iowa.gov/educate/prodev/science_dl.html)
3. <http://scholarworks.umass.edu/dissertations/AAI321274>
4. [www.freedomwritersfoundation.org](http://www.freedomwritersfoundation.org)

#### **Additional Resources:**

- [www.crosscultured.com/downloads.asp](http://www.crosscultured.com/downloads.asp)
- <http://64.38.12.138/> (Indians.com)
- [www.firstpeople.us](http://www.firstpeople.us)
- [www.mcrel.org/topics/products/56/](http://www.mcrel.org/topics/products/56/)
- [www.colorado.edu/education/BUENO/](http://www.colorado.edu/education/BUENO/)
- [www.colorincolorado.org](http://www.colorincolorado.org)
- [www.practicaltheory.org/serendipity](http://www.practicaltheory.org/serendipity)

### **ISSUE FORUM 4:**

#### **COMPONENTS OF A SUPPORT SYSTEM FOR SCIENCE TEACHERS**

#### **Abstract:**

One of the foundational principles of the No Child Left Behind Act is the idea that teacher quality (educational background, ongoing and sustained professional development, and instructional practices) is the single most important school factor in student achievement. For science educators to be successful, they must have the full support and active participation of school leaders, district administrators, school boards, parents, and students (NSTA). When teachers are not supported, the loss to students, educators, schools, communities and taxpayers is immense. A growing body of evidence suggests that the support teachers receive once they are in the classroom makes a tremendous difference in their performance and their willingness to remain in the classroom. Districts and schools that have created instructional and peer coaching programs for new and veteran teachers have found that student achievement and teacher-retention rates have increased.

### **Guiding Questions and Issues to Consider:**

1. What changes should schools make to improve teachers' professional development and job satisfaction?
2. How do principals build supportive school cultures in which high student achievement and teacher professional development and retention are cultivated?
3. What is "coaching"? What benefits does coaching have on improving student achievement?
4. What are the characteristics of an effective coach? What does a coach need to know and be able to do?
5. What do we know about effective coaching in terms of duration and frequency?
6. What can be done to encourage schools to provide support for grade-level and/or content/pedagogical specific research-based professional development rather than the standard "one size fits all" model?

### **Readings**

*What Keeps Good Teachers in the Classroom? Understanding and Reducing Teacher Turnover.* Alliance for Excellent Education. February 2008. [www.all4ed.org/files/TeachTurn.pdf](http://www.all4ed.org/files/TeachTurn.pdf)

Annenberg Institute for School Reform. *Instructional Coaching – Professional Development Strategies that Improve Instruction.*

<http://www.annenberginstitute.org/pdf/InstructionalCoaching.pdf>

Kowal, J. and Steiner, L (2007). *Instructional Coaching.* The Center For Comprehensive School Reform. [www.centerforsri.org/files/CenterIssueBriefSept07/Coaching.pdf](http://www.centerforsri.org/files/CenterIssueBriefSept07/Coaching.pdf)

### **Additional References**

- <http://www.nsta.org/about/positions/leadership.aspx>
- <http://www.nsta.org/about/positions/professionalism.aspx>
- NSTA (2000, April 7). *High Turnover of Science Teachers Requires Schools to Change.* April 28, 2004. <http://www.nsta.org/publications/surveys/survey20000407.aspx>
- <http://www.nsta.org/publications/surveys/survey20000407.aspx>
- Boyd, V. & McGree, K. (1995). *Leading change from the classroom: Teachers as leaders. Issues ... about Change, 4* (4). Austin, TX: Southwest Educational Development Laboratory. <http://www.sedl.org/change/issues/issues44.html>

## **ISSUE FORUM 5: OPTIMIZING SCIENCE IN THE ELEMENTARY GRADES**

### **Abstract:**

The provisions in NCLB have created a critical disparity in our nation's elementary classrooms. The concentration on reading and mathematics instruction has resulted in a significant reduction in students' opportunities to experience and learn science. This not only affects elementary students and teachers but also impacts all levels of science education. If we are to prepare students to be scientifically literate and increase the number of students in the science pipeline, the entire science education community needs to advocate for the crucial role of elementary science education programs. This forum continues the work of the 2008 Summer Congress to investigate how all science educators can muster involvement and support for elementary science education's central role.

### **Guiding Questions and Issues to Consider:**

1. How has the amount of time spent teaching elementary science changed as a result of NCLB legislation? What changes can we expect with the current administration?
2. What reforms and support are needed at the district, state, and federal levels to make elementary science a core subject?
3. How can state chapters, affiliated groups, NSTA, and related educational disciplines (i.e., mathematics, technology, engineering) become better advocates for elementary science?
4. What transformation(s) must occur elementary science to become a core subject area in the curriculum?)

**Resources:**

NSTA Position on Elementary School Science.

<http://www.nsta.org/about/positions/elementary.aspx>

Griffith, George and Scharmann, Lawrence. Initial impacts of No Child Left Behind on Elementary Science Education. *Journal of Elementary Science Education*. June 2008

[http://www.accessmylibrary.com/comsite5/bin/aml\\_landing\\_tt.pl?purchase\\_type=ITM&item\\_id=0286-35081946&action=print&page=aml\\_article\\_print](http://www.accessmylibrary.com/comsite5/bin/aml_landing_tt.pl?purchase_type=ITM&item_id=0286-35081946&action=print&page=aml_article_print)

Pratt, Harold. Science Education's 'Overlooked Ingredient.'

[http://science.nsta.org/nstaexpress/nstaexpress\\_2007\\_10\\_29\\_pratt.htm](http://science.nsta.org/nstaexpress/nstaexpress_2007_10_29_pratt.htm)

Keeley, P. Elementary Science Education in the K-12 System. *NSTA Reports*. May 2009.

<http://www.nsta.org/publications/news/story.aspx?id=55954>.

**ISSUE FORUM 6: K-8 INTEGRATION OF SCIENCE & MATHEMATICS****Abstract:**

In today's world, it is vitally important that students in K-12 classrooms are taught meaningful science and mathematics so that they will be equipped with both skills and knowledge to ensure success in their future. Integration of mathematics and science has been a key issue in education. Many calls for educational reform in the United States tend to lump mathematics and science together. When students make the connections between the disciplines, what they are learning becomes more relevant. However, there are also many obstacles to overcome – one of which is the teacher certification/licensure process. The focus of this session will be to explore how integration of these subjects can possibly lead to more relevant and meaningful learning, and how teacher preparation programs can make integration more successful.

**Guiding Questions and Issues to Consider:**

1. How can integration be accomplished so that each subject area is equally addressed?
2. What are the characteristics of a true interdisciplinary program?
3. How can you determine the merits of an interdisciplinary program?
4. How can teacher preparation programs be more supportive of interdisciplinary teaching at the secondary level?

**Resources:**

Furner, J. M. & Kumar, D.D. (2007). The Mathematics and Science Integration Argument: A Stand for Teacher Education. *Eurasia Journal of Mathematics, Science & Technology Education*, 3(3), 185-189.

[http://www.ejmste.com/v3n3/EJMSTE\\_v3n3\\_Furner&Kumar.pdf](http://www.ejmste.com/v3n3/EJMSTE_v3n3_Furner&Kumar.pdf)

Keeley, P. Elementary *NSTA Reports: Science in the K-12 System*. April 2009.

<http://www.nsta.org/publications/news/story.aspx?id=55954>

Lonning, Robert A and DeFranco, Thomas C . Integration of science and mathematics: A theoretical model. *School Science and Mathematics*, Apr 1997.

[http://findarticles.com/p/articles/mi\\_qa3667/is\\_199704/ai\\_n8767490?tag=rbxcra.2.a.22](http://findarticles.com/p/articles/mi_qa3667/is_199704/ai_n8767490?tag=rbxcra.2.a.22)

Meier, Sherry L, and Nicol, Marsha, Potential benefits and barriers to integration. *School Science and Mathematics*, Dec 1998.

[http://findarticles.com/p/articles/mi\\_qa3667/is\\_199812/ai\\_n8808455](http://findarticles.com/p/articles/mi_qa3667/is_199812/ai_n8808455)

Pang, JeongSuk and Good, Ron. A review of the integration of science and mathematics: Implications for further research. *School Science and Mathematics* , Feb 2000.

[http://findarticles.com/p/articles/mi\\_qa3667/is\\_200002/ai\\_n8882997](http://findarticles.com/p/articles/mi_qa3667/is_200002/ai_n8882997)