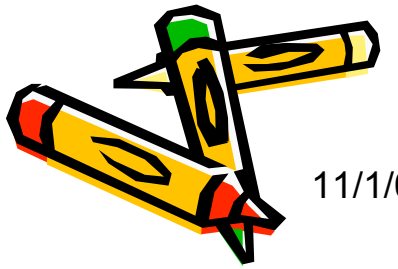
Is preschool too early for STEM education?

MASS/MassCUE 2009

Isa Kaftal Zimmerman

No…why?

- Upper elementary students lose interest in STEM
- The nation needs every student learning STEM content & skills



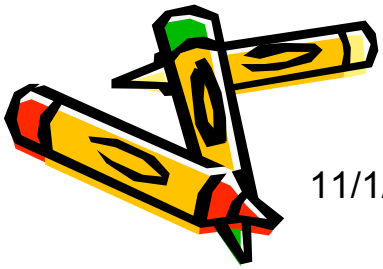
Lots of interest in the subject

Finally getting smart about investing in learning by Kathleen McCartney, March 13, 2009 The Boston Globe

Keeping Mass. an innovation leader, **Drew Gilpin Faust & Jack M. Wilson, May 9, 2009**

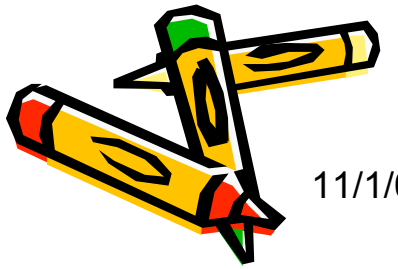
The Boston Globe

BESE Approves New Math Requirement for Aspiring Elementary Educators, **May 19, 2009** from web site



Lots of interest.2

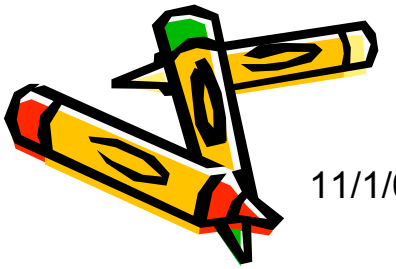
- *The crisis in math, science*, **Solomon Friedberg, May 21, 2009**
- *Pentagon fears technology edge may be eroding,* **Defense officials cite shortage of scientists, Bryan Bender, The Boston Globe June 13, 2009**



Lots of interest.3

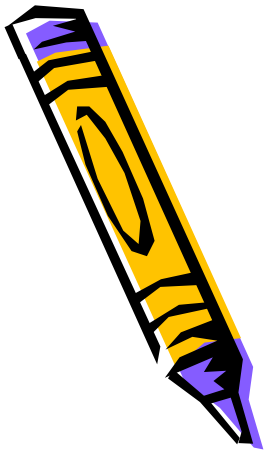
- June 23, 2009 **Report Touts Educational Benefits of Computer Games By Kathleen Kennedy Manzo**

- July 2, 2009 **NRC Urges Greater Focus on Preschool Math By Sean Cavanagh**



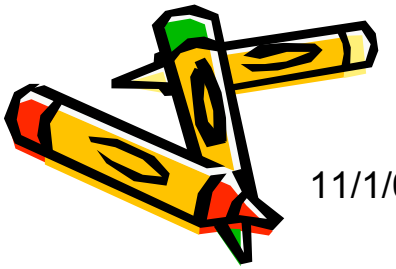
» *Both Published Online*

Here is some of what they wrote:

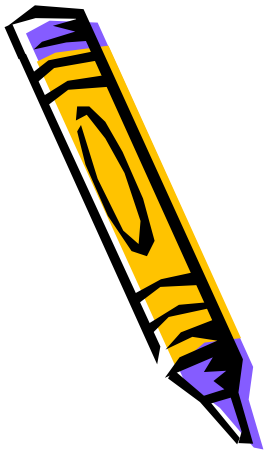


- *3/4 of aspiring elementary teachers failed the new math section in licensure test*
- *High failure rate reflects teachers do not have a strong background in math*
- *Are responsible for poor student achievement in the subject in middle and high schools.*

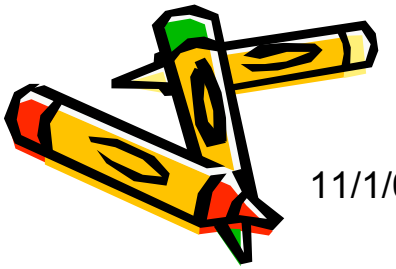
May 19



And then they wrote.2



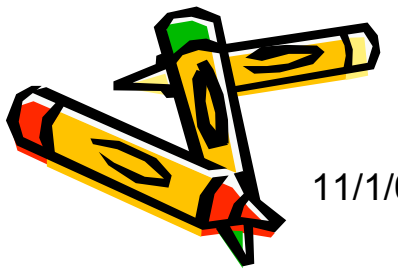
- *The nation is not producing enough well-qualified teachers of math and science.*
- *And too many of the ones it does produce are leaving the classroom after a few years.*
  - **May 21, 2009's Boston Globe**



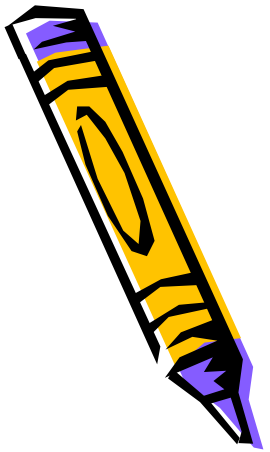
Hot off the press:

- **Lt. Gov appointed chair of STEM Advisory Committee**
- **Gov signs executive order**
- **STEM plan will be developed**
- **STEM point person**

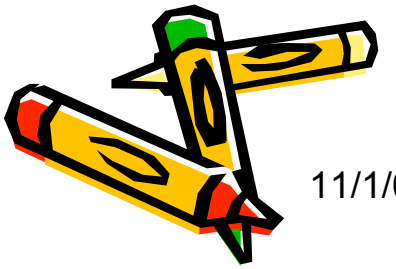
STEM Summit VI, Oct. 20, 2009



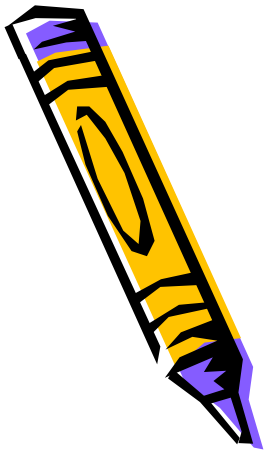
So Aspire decided to act



- **A Reasonable Proposal to Improve the Teaching of Mathematics and Science in Pre-School to Grade Three**
  - ***Disseminated & published on Wheelock website***

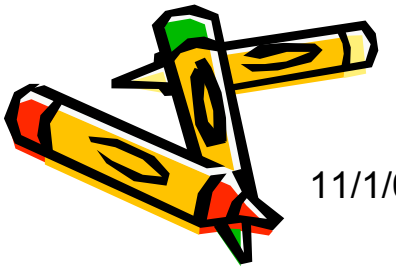


But how?



Contrary to Ecclesiastes, there is no (good) time (in any season) for change in (higher) education.

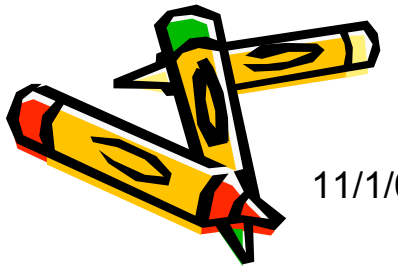
There is not even a better time.



Aspire at Wheelock to:

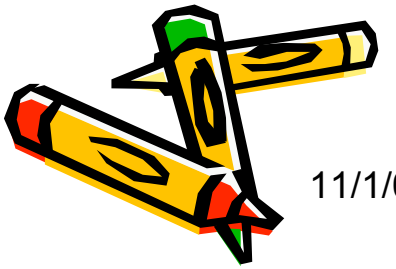
Strengthen STEM teacher pipeline convened a Higher Education STEM Partnership

- **Improve recruitment, preparation & instructional knowledge & skill of prospective preschool through third-grade teachers in math & science.**



More 1

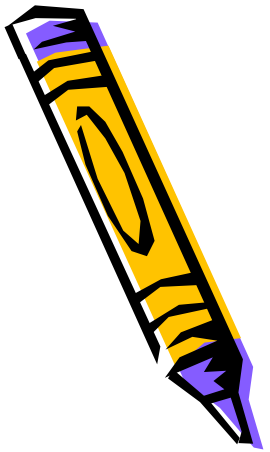
- **Greatly enhance classroom & school-wide practice so that high quality math & science learning become a significant part of preschool through third-grade learning communities.**



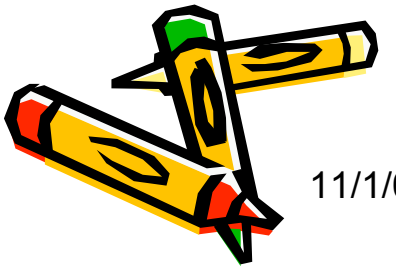
Who responded

Boston Children's Museum • Boston Teacher Residency • Boston University • Brandeis University • Clark University • DESE • Emmanuel College • Mass Bay CC • Mass Tech Collaborative • Middlesex CC • Roxbury CC• Museum of Science, Boston • Simmons College • Urban College of Boston • Wheelock College • DEEC •Boston Public Schools • UMassBoston •Science Club for Girls • TERC • Tufts University

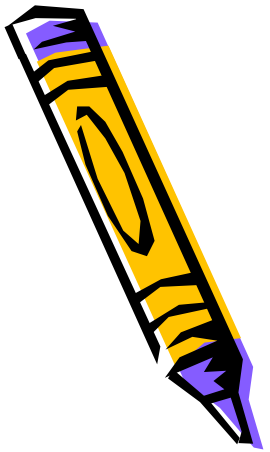
Three starting critical ?s



- **1. What should be the content of preparation programs?**
- **2. What should be the pedagogy taught and how should teachers learn it?**
- **3. How should those be delivered to students?**

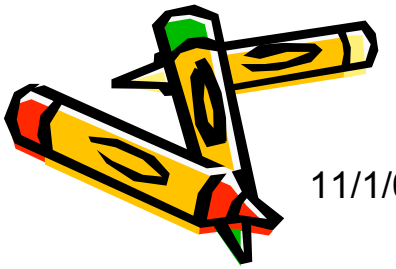


Survey 1 * netted



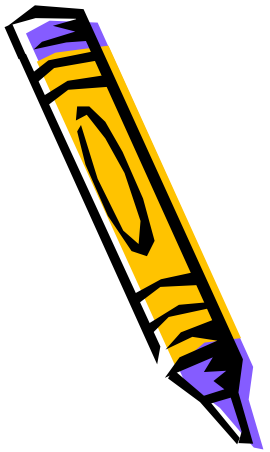
- *1. We should start with student learning and work back from that.* **(5)**

- *8. What are the best practices in teacher preparation currently available? What does each institution consider its best practices in teacher preparation?* **(7)**



•of members in the Partnership

Survey 1



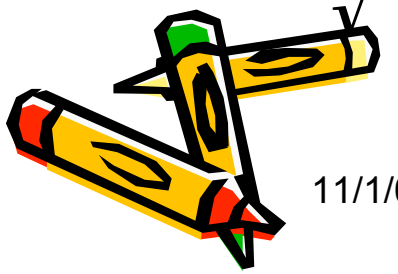
- *9. Is what we teach currently reflected on the MTEL? Is there a different imperative for those who seek a license and those who do not need one? Does that get reflected in the curriculum, courses, programs we provide?* **(6)**

- *10. What do teachers need to know? How can we best prepare them?* **(5)**

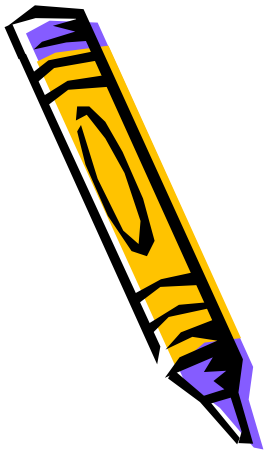
Survey 2*

- **High degree of agreement:**
  - **√ Require courses each in math & science content & pedagogy**
  - **√ Teach teachers as they will teach students (play & hands-on & doing experiments & using technology)**
  - **√ Give teachers real world experiences**

***of the Partnership members**

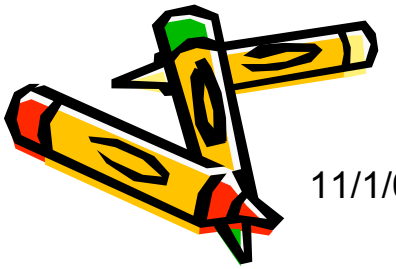


Survey 2.2

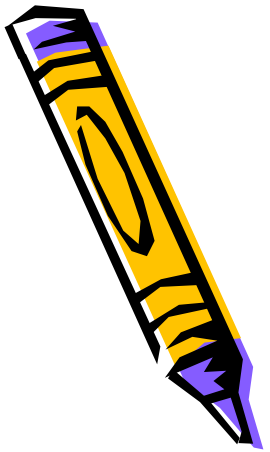


- **Encourage students to be creative, find alternative, conceptually sound solutions & approaches**

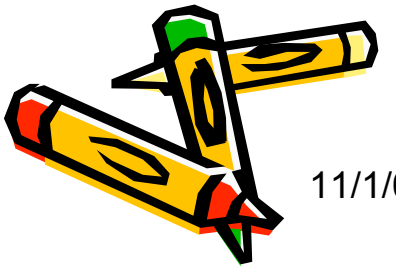
- **Mentoring of teachers is essential**



Challenges and priorities:



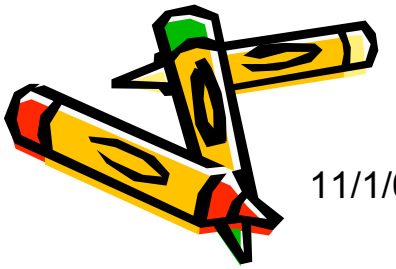
1. **Collect best practices in teacher preparation available from all the partner institutions & define 'a ready to teach' urban educator in science & mathematics**



And these

2. Reach a common understanding about what pre-school/elementary teachers need to know & how to prepare them *in* the future *for* the future

3. Align licensure & state program approval for teacher education programs to reflect this understanding



All to be accomplished

in collaboration with:

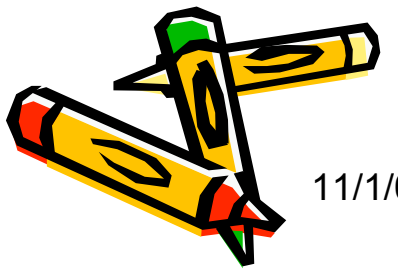
Executive Office of Education

Department of Early Education and Care

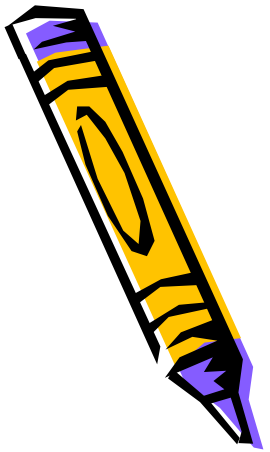
Department of Elementary and Secondary Education

Department of Higher Education

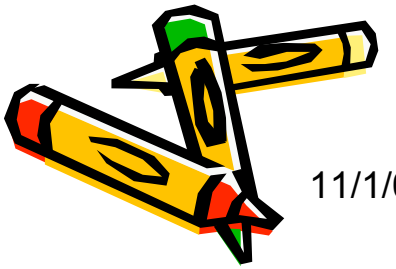
AND preschool through grade three teacher preparation institutions/organizations



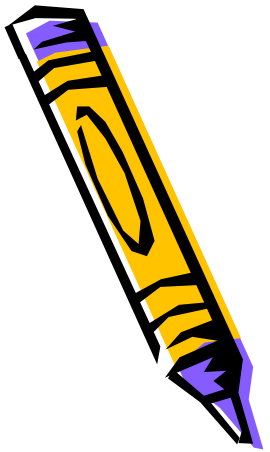
Proposal 1



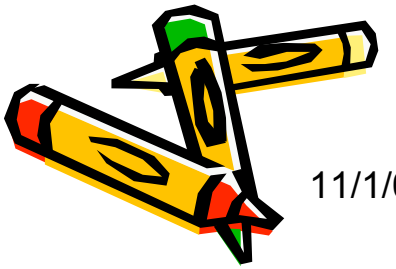
- **Link the participants in a COMPACT to work together on the elements determined to be essential/highly desirable & develop sustainable relationships**



Proposal 2

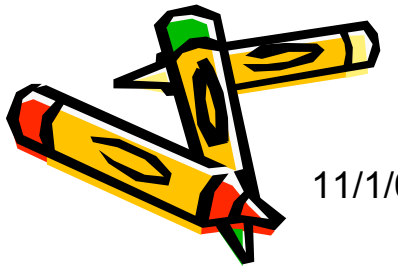


Affirm standards for mathematics & science content knowledge & instructional practices for preschool to grade three teachers

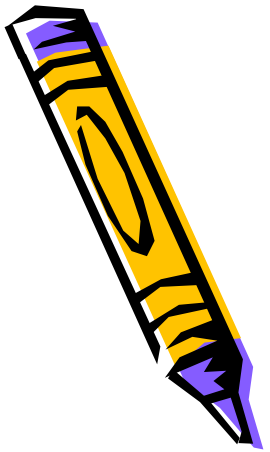


Proposal 3

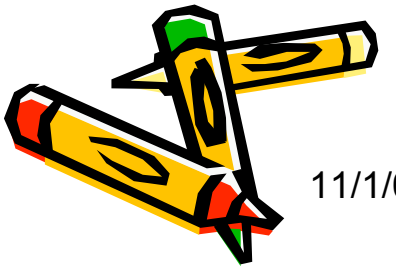
Develop/adapt, pilot & evaluate targeted, intensive, embedded PD for current pre-school to grade three teachers in a limited number of schools/preschools in the fall of 2010



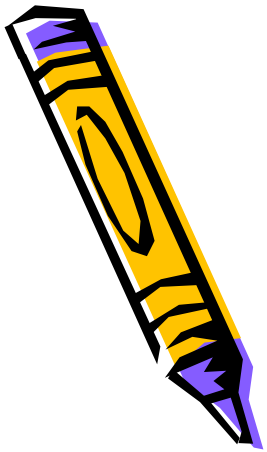
Proposal 4



- **Develop, pilot & evaluate capacity-building initiative to increase course-work in mathematics & science to pre-service teachers & aligned preparation for the mathematics portion of the MTEL**

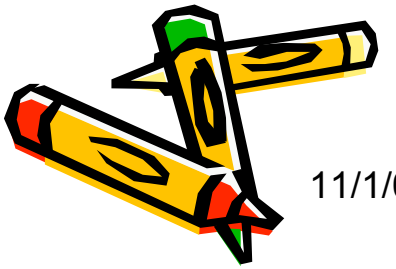


Proposal 5

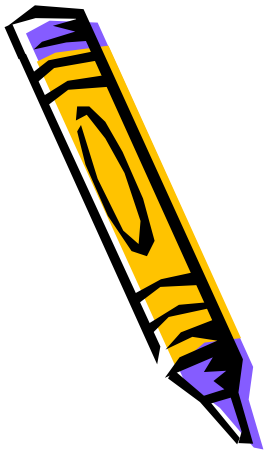


- Expand pilot initiatives to broaden in-service & pre-service mathematics & science education proficiency

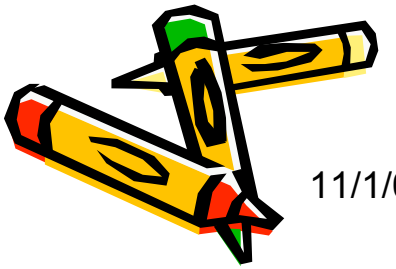
- Revise licensure & state program approval for teacher education programs



Proposal 6

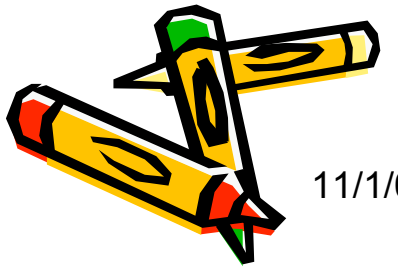


- **Establish Clinical schools specializing in developing pre-service & in-service teachers who are effective in mathematics & science instruction.**



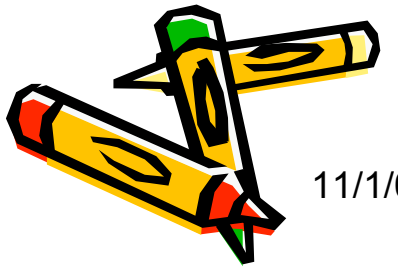
Proposal 7

- **Seek broad implementation of newly designed programs that meet the mathematics & science needs of 21st century students & the economy, in the partnership & in other MA institutions.**



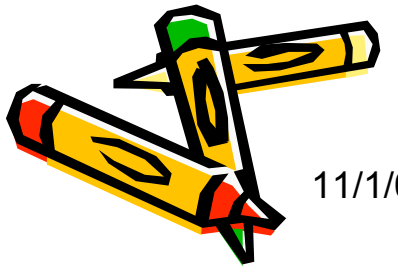
Can it be done?

- **Three years is a swift timeline but these issues have been examined, researched & discussed.**
- **The profession knows what should be done to prepare teachers better in science &mathematics.**
- **What is needed now is immediate and concerted action.**



Why is this important to you?

- It cannot occur without the support & cooperation of leadership in the schools
- You must prepare your students for their future



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