North Carolina Advancing Science Technology Engineering & Mathematics Education

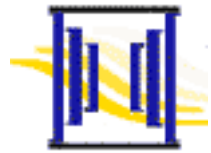Joint Education Oversight Committee

February 8, 2012

NC STEM LEARNING NETWORK

Will Connect North Carolina's many STEM initiatives to local, state and national expert partners to replicate and scale efforts to help all students fill NC jobs.

CAREER & COLLEGE ready, set, go!

PUBLIC SCHOOLS OF NORTH CAROLINA
State Board of Education
Department of Public Instruction

SMT
North Carolina Science, Mathematics, and Technology Education Center

MCNC

JOBS Commission

TIES
TEACHING INSTITUTE FOR EXCELLENCE IN STEM

BILL & MELINDA GATES foundation

Ohio STEM Learning Network

CISCO SYSTEMS

Google

Battelle
The Business of Innovation

THE RESEARCH TRIANGLE PARK

KASEY KAHNE FOUNDATION
5K FIVE KAHNE
Sponsored by: Bank of America

NC STEM provides policy, communication and education expertise to advise decision makers working to align education and economic needs

Why STEM? Why Now?

Today:
400,000+ STEM Related NC Jobs

STEM Jobs will Grow 23% Faster than all other sectors

NC State of the Workforce 2011

STEM Jobs pay 64% more than other jobs in NC.
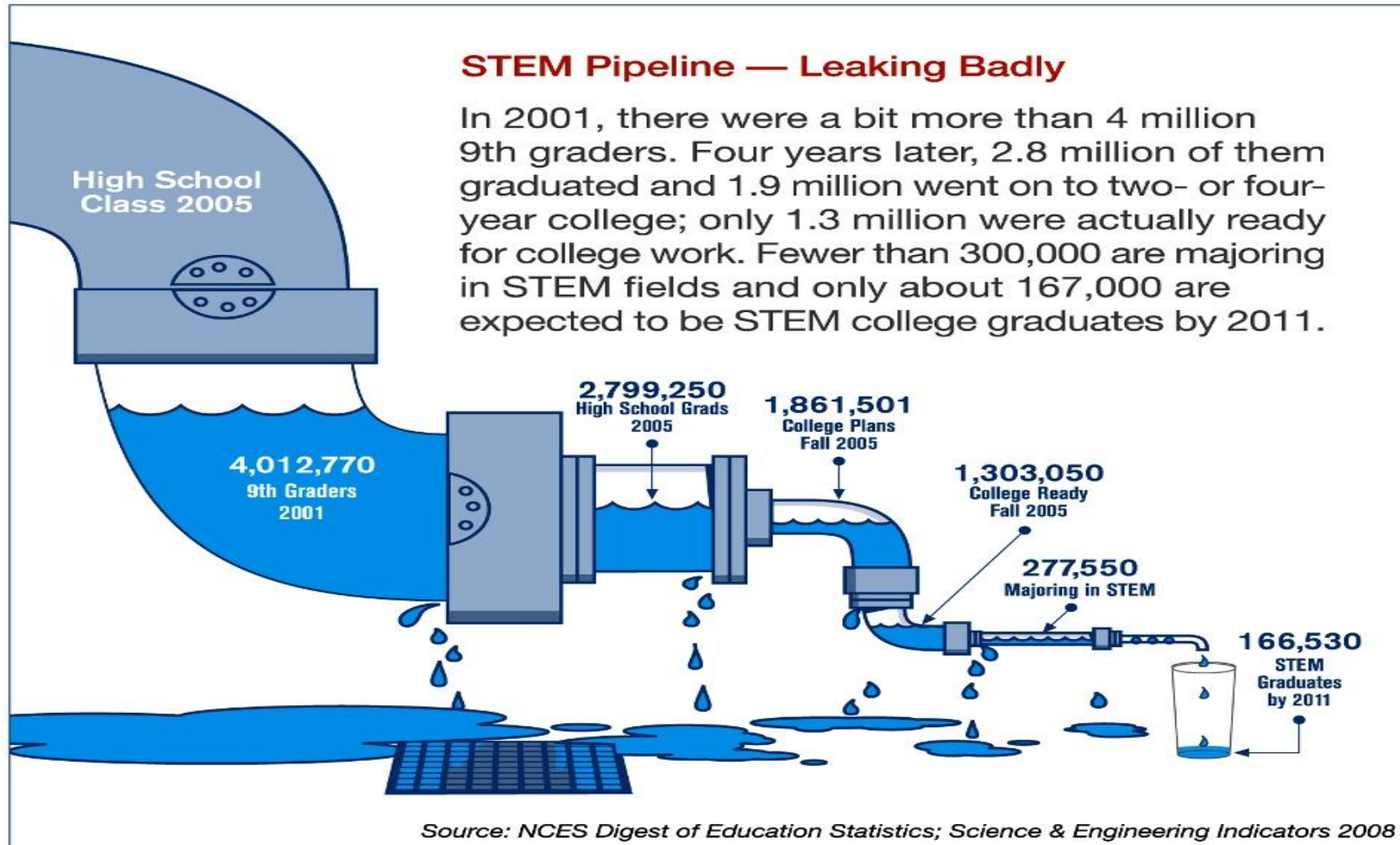
NC State of the Workforce 2011

63% of STEM Jobs Requiring 2 Year Credentials Pay More Than Non-STEM Jobs Requiring Bachelors Degree

"STEM", Georgetown Center for Education & the Workforce

Our education system is not producing enough STEM-capable students to keep up with demand both in traditional STEM occupations and other sectors across the economy that demand similar competencies

"STEM", Georgetown Center for Education & the Workforce

Why is STEM education important?

STEM Pipeline — Leaking Badly

In 2001, there were a bit more than 4 million 9th graders. Four years later, 2.8 million of them graduated and 1.9 million went on to two- or four-year college; only 1.3 million were actually ready for college work. Fewer than 300,000 are majoring in STEM fields and only about 167,000 are expected to be STEM college graduates by 2011.

High School Class 2005

4,012,770 9th Graders 2001

2,799,250 High School Grads 2005

1,861,501 College Plans Fall 2005

1,303,050 College Ready Fall 2005

277,550 Majoring in STEM

166,530 STEM Graduates by 2011

Source: NCES Digest of Education Statistics; Science & Engineering Indicators 2008
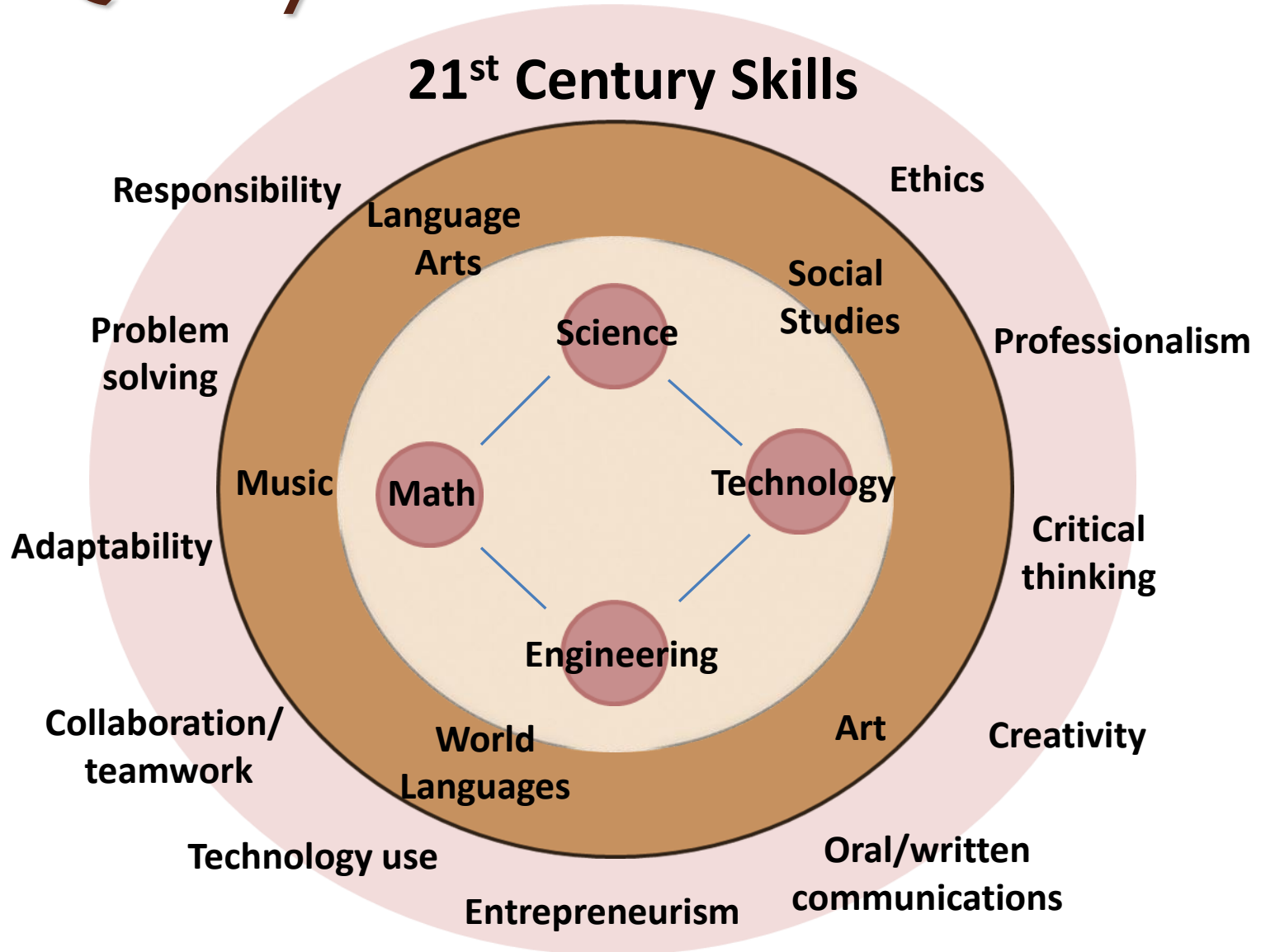
What is STEM education?

STEM education provides young people with innovative project based learning environments that integrate the principles of science, technology, engineering & mathematics into every classroom.

By utilizing STEM education, a typical teacher-centered classroom is transformed into a learning experience facilitated by the teacher and driven by problem solving, group discovery and exploratory learning.
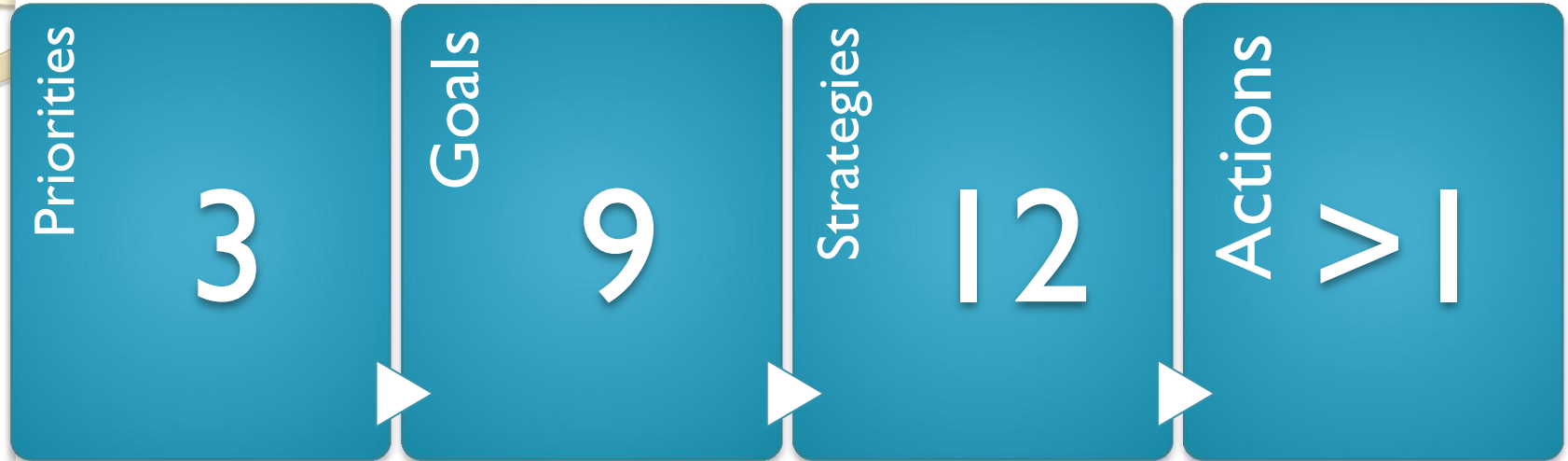
Quality STEM Education

21st Century Skills

Responsibility

Ethics

Language Arts

Social Studies

Professionalism

Problem solving

Science

Music

Math

Technology

Critical thinking

Adaptability

Engineering

Collaboration/ teamwork

World Languages

Art

Creativity

Technology use

Oral/written communications

Entrepreneurism

What is NC doing? Lots.

- Businesses & Communities in every economic development region reported to the JOBS Commission a significant need for STEM-capable workforce – and shared a local program or initiative.

- NC STEM identified over 500 public and private programs in some aspect of STEM education.

- North Carolina is seen as a leader in STEM education nationally.

Format of Statewide K12 STEM Strategy
Aligned with Post-Secondary & Economic Needs

Priorities
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Goals
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Strategies
12

Actions
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Worked with All Sectors, including Members of General Assembly, NC STEM Advisory Panel of JOBS Commission, Governor's Education Transformation, Education Cabinet Members, Economic Development, Business & Industry, Local Education Agencies, Foundations and Community Members from across the state

North Carolina's Three STEM Priorities

Priorities

Increase STEM Achievement

Build Public Understanding & Support

Align Public & Private Resources

NC Statewide K12 STEM Strategy Aligned with Post-Secondary & Economic Needs

Priority	Goals	Recommended Strategies
Increasing STEM Achievement	Increase student interest in STEM fields and in continuing their education Increase STEM Achievement of K-12 students Increase the graduation rate of students in STEM programs Decrease postsecondary remediation rates Increase the number of teachers prepared and delivering integrated STEM education	1. *Adopt defined list of STEM Attributes* 2. *Create Measurable Goals & Indicators* 3. *Identify High-Quality Tools & Supports for Schools & Districts* 4. *Design a STEM Designation* 5. *Increase STEM Educator Development*
Build Community Understanding and Support	Increase community understanding, awareness, and support for the economic challenges. Increase the connections, partnerships, and growth of high-quality programs, schools, and tools	6. *Launch a Public Awareness Campaign on STEM* 7. *Identify and Convene Best Practices* 8. *Host a One-Stop STEM Web Portal*
Align Public & Private Resources	Increase returns on public and private investments in STEM education Align & coordinate the investments of public & private sector partners to scale high-quality programs efficiently	9. *Invest Public & Private Funds* 10. *Designate & Fund a Public/Private Partner* 11. *Incentivize Collaborations* 12. *Name a Statewide STEM Council*

Endorsed by General Assembly Legislative JOBS Commission, Oct 2011; Adopted by NC State Board of Education, Nov 2011

- Designed to keep North Carolina in a leadership position in education and economic development

- Public Private Partnership to advance multiple strategies and initiatives

- Letter of Intent between NC Department of Public Instruction, NC Community College System and UNC General Administration & NC SMT Center with private sector partners to collaborate on PreK-20 STEM Strategic Initiatives

Specifically, NC DPI, NCCCS & UNC-GA will:

1. Develop **K20 STEM Scorecard**
2. Develop **STEM Web Portal** (based on eLearning Commission framework)
3. Lead **Public Awareness Campaign** for Communities Statewide
4. **Network of Schools, Districts & Partners**
5. **Potential Focus Projects**
    1. Common Core Mathematics
    2. STEM Teacher Certifications

Update on National Efforts in STEM

Educate to Innovate

- White House led Initiative under President Obama
- Umbrella initiative, giving rise to Change The Equation, 100kin10, and, starting Fall 2011, design challenges, competitions, other federal led innovations with US Dept of Education

Change the Equation

- Create widespread literacy in STEM as an investment in our nation that empowers us all.
- Work with 110 Business Members to spread small # of programs, create a scorecard, lead advocacy, assist improvement of member programs/investment

STEM Connector

- Collecting & Sharing Statewide Partnerships, Initiatives and contacts
- Launching Fall 2011

Business Roundtable

- Increase the number of US STEM Bachelor's level graduates to 400,000 to increase American competitiveness
- Policy Advocacy, reports, and broader initiatives

100k in 10

- Collaborative movement created in response to President Obama's call for 100,000 new STEM teachers in 10 years.
- Increase Supply, Retain Excellence, Build the Movement

Other National Scope Initiatives

- STEM Education Coalition
- Innovate to Educate
- International Center for Leadership in Education
- National Governor's Assoc Ctr of Best Practices
- Teaching Institute for Excellence in STEM
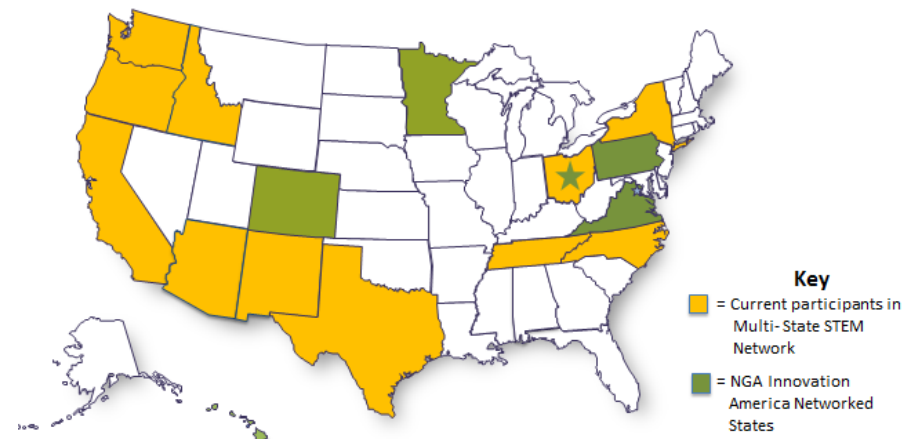- NSF ITEST

Emerging Multi-State STEM Network

DIVERSE STATES, BUT SHARED PERSPECTIVES – WITH EACH OTHER & NATIONAL PARTNERS

1. *Create and launch a high-capacity, networked infrastructure charged with critical knowledge capture, dissemination, and utilization*
2. *Build a shared agenda for student success in STEM that will support individual state needs and our needs as a country.*
3. *Align and amplify shared messages that inspire and engage the public and policy makers in supporting student success in STEM.*
4. *Encourage public/private partnerships that strengthen state STEM networks' ability to serve as facilitators and trusted partners to accelerate STEM student achievement.*

2011)

(Reference: White House memo, Summer

North Carolina

Part of Initial 11 Core States

Launching Later 2012

Key

= Current participants in Multi-State STEM Network

= NGA Innovation America Networked States

Thank You!

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Attributes of STEM Schools

- **Integrated STEM curriculum, aligned with state, national, international and industry standards** , including:

  Project-based learning with integrated content across subjects

  Connections to effective in- and out-of-school programs

  Integration of technology and virtual learning

  Authentic assessment and exhibition of STEM skills

  Professional development on integrated STEM curriculum, community/industry partnerships and postsecondary education connections

  Outreach, support and focus on underserved, especially females, minorities, and economic disadvantaged

- **On-going community and industry engagement,** including:

  A communicated STEM plan is adopted across education, communities & businesses

  - Work-based learning experiences, to increase interest and abilities in fields requiring STEM skills, for each student and teacher

  - Business and community partnerships for mentorship, internship and other opportunities that extend the classroom walls

- **Connections with postsecondary education,** including:

  - Alignment of student's career pathway with post-secondary program(s)

  - Credit completion at community colleges, colleges and/or universities

Based on Local, State, National Research and Public feedback from 125+ Practitioners, Educators and Business Leaders

Tools Provided to Schools (Rubrics, Web Portal)