High School STEM Pathways
Jump Start Convention
January 2018

Jill Cowart
Jill.Cowart@la.gov

Agenda

- **Why Focus on STEM?**

- **Current K-16 JumpStart Pathways**

- **Future Vision and Next Steps**

Agenda

- **Why Focus on STEM?**

- **Current K-16 JumpStart Pathways**
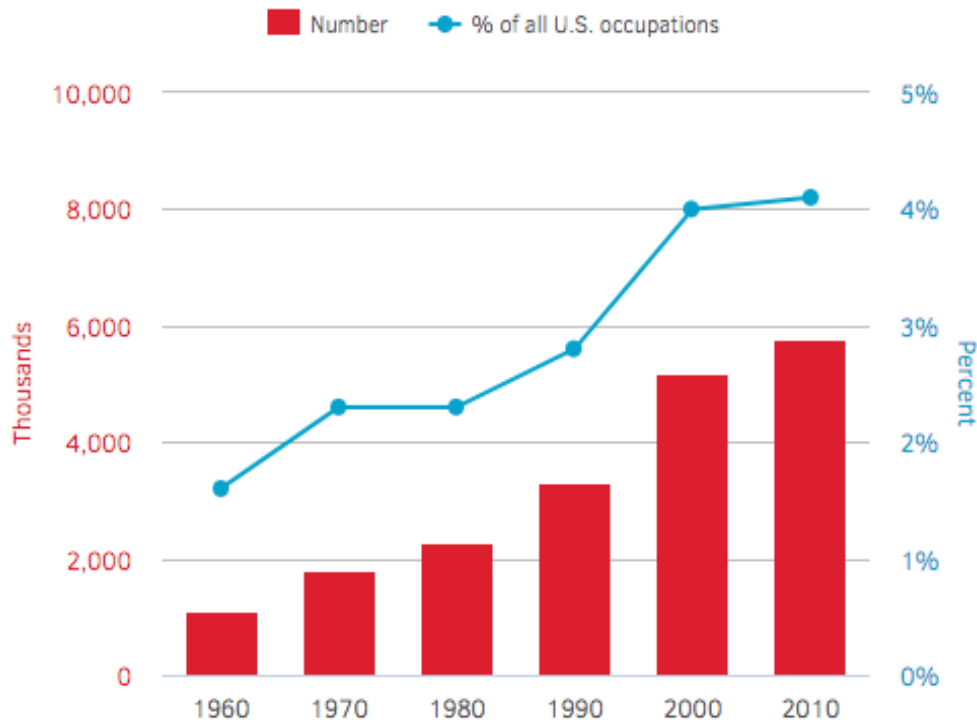
- **Future Vision and Next Steps**

Why Focus on STEM?

The Demands of the Workforce Nationally

Data from the
National Science
Foundation

Louisiana Believes

Individuals in S&E occupations in the United States: 1960-2011

Legend: Number, % of all U.S. occupations

Y-axis (left): Thousands — 0, 2,000, 4,000, 6,000, 8,000, 10,000
Y-axis (right): Percent — 0%, 1%, 2%, 3%, 4%, 5%
X-axis: 1960, 1970, 1980, 1990, 2000, 2010

Notes:

S&E = science and engineering. S&E occupations are those in biological/agricultural/environmental life sciences, physical sciences, computer sciences, mathematics/statistics, engineering, psychology, and social sciences. Physical sciences = chemistry, physics, astronomy, and earth/ ocean/atmospheric sciences.
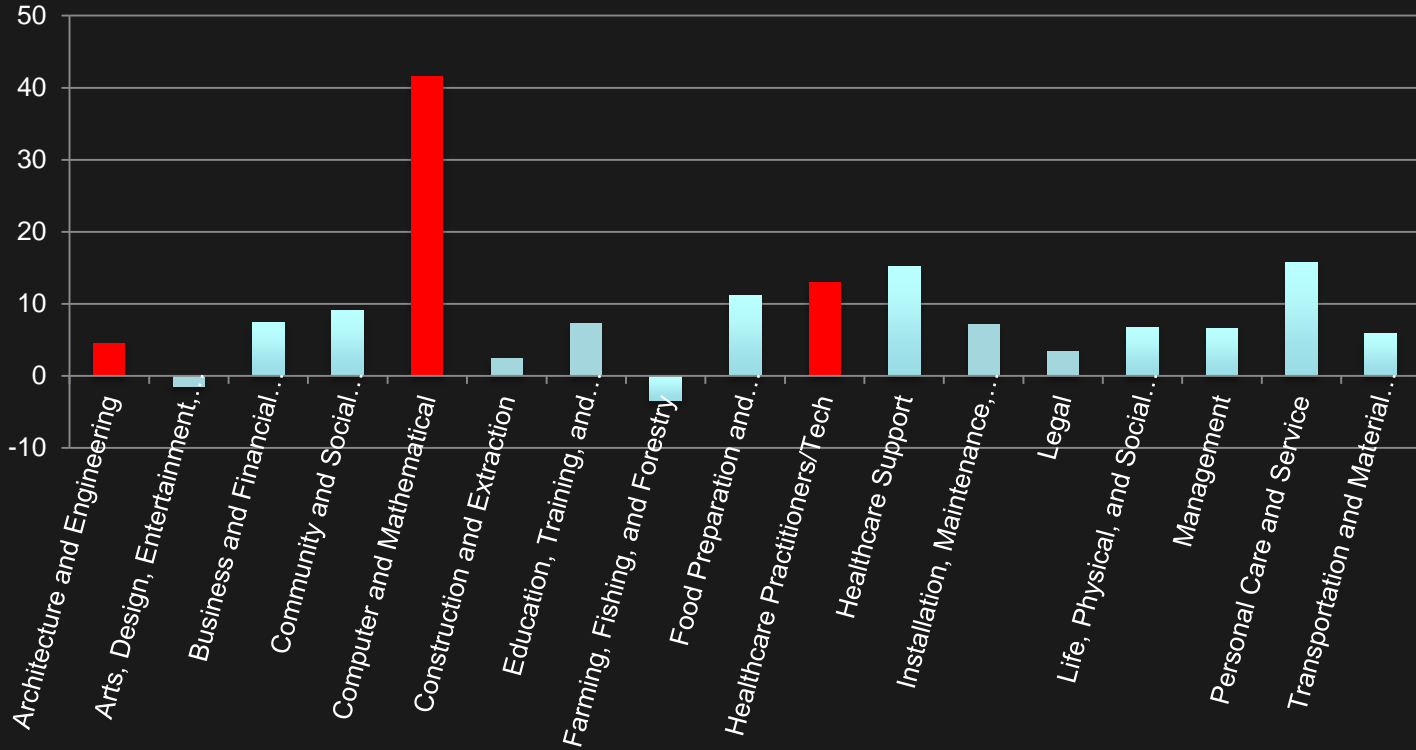
Why Focus on STEM?

The Demands of the Workforce Nationally

Louisiana Believes

Percent Change of Occupational Projections in Louisiana 2014-2024
Louisiana Workforce Commission (Source: Labor Market Statistics, Occupational Employment Projections Program)

Categories (left to right):
- Architecture and Engineering
- Arts, Design, Entertainment...
- Business and Financial...
- Community and Social...
- Computer and Mathematical
- Construction and Extraction
- Education, Training, and...
- Farming, Fishing, and Forestry
- Food Preparation and...
- Healthcare Practitioners/Tech
- Healthcare Support
- Installation, Maintenance...
- Legal
- Life, Physical, and Social...
- Management
- Personal Care and Service
- Transportation and Material...

Why Focus on STEM?
The Interests of Our Students

According to a recent ACT report, in 2017, 51% of Louisiana students indicated having an interest in STEM majors and/or careers.
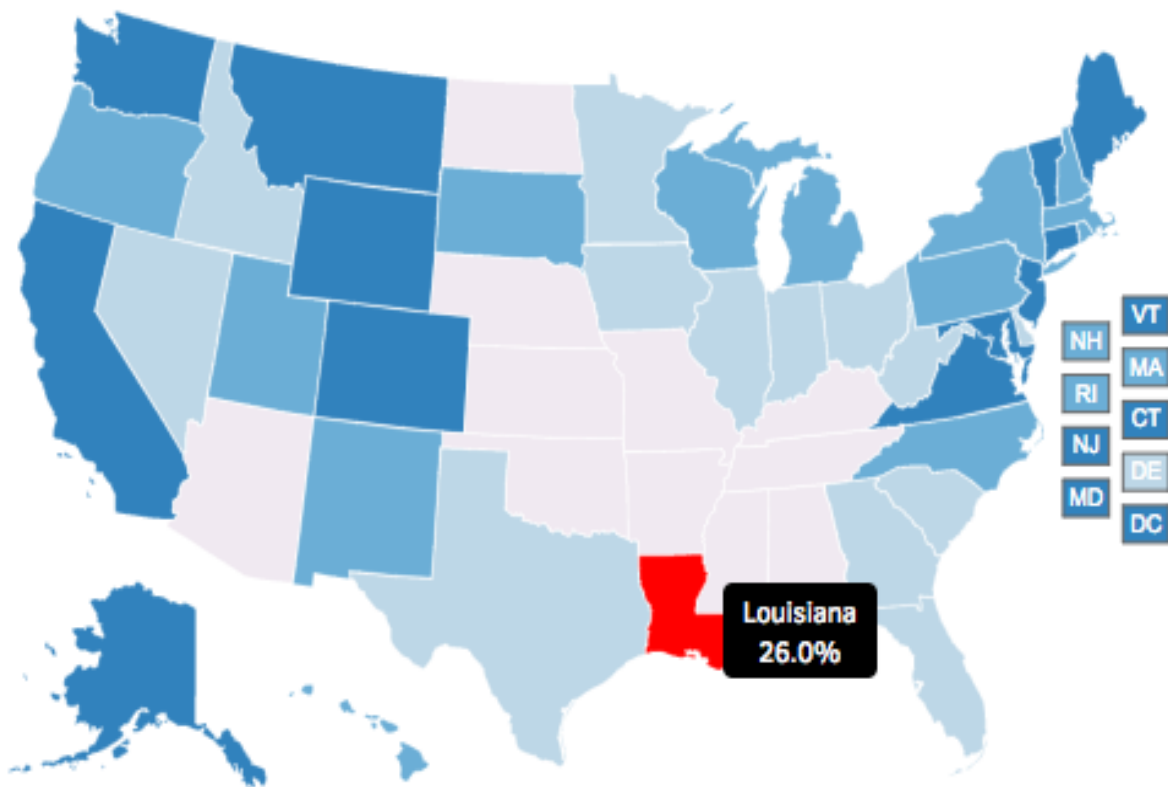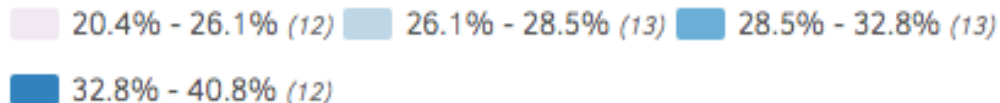
However, only 8% of our students met the STEM benchmark (demonstrated proficiency in mathematics and science). The national average is 21%.

Why Focus on STEM?

The Post Graduate Paths of Our Students

Louisiana Believes

Science and engineering degrees as a percentage of higher education degrees conferred, by state: 2011
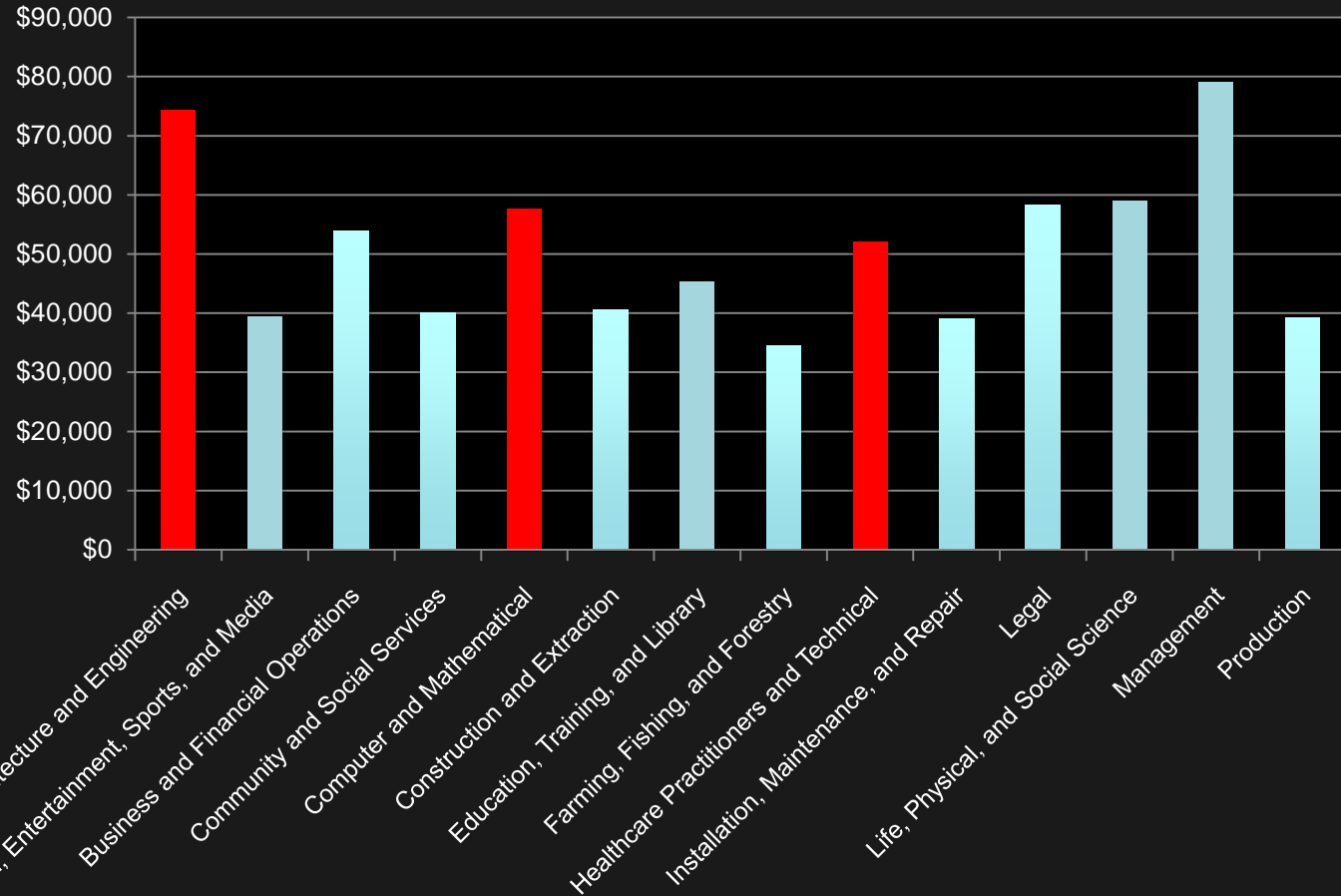
20.4% - 26.1% (12) 26.1% - 28.5% (13) 28.5% - 32.8% (13)

32.8% - 40.8% (12)

Louisiana 26.0%

Why Focus on STEM?

The Future Earning Potential of Students

Louisiana Believes

Median Income in Louisiana by Category

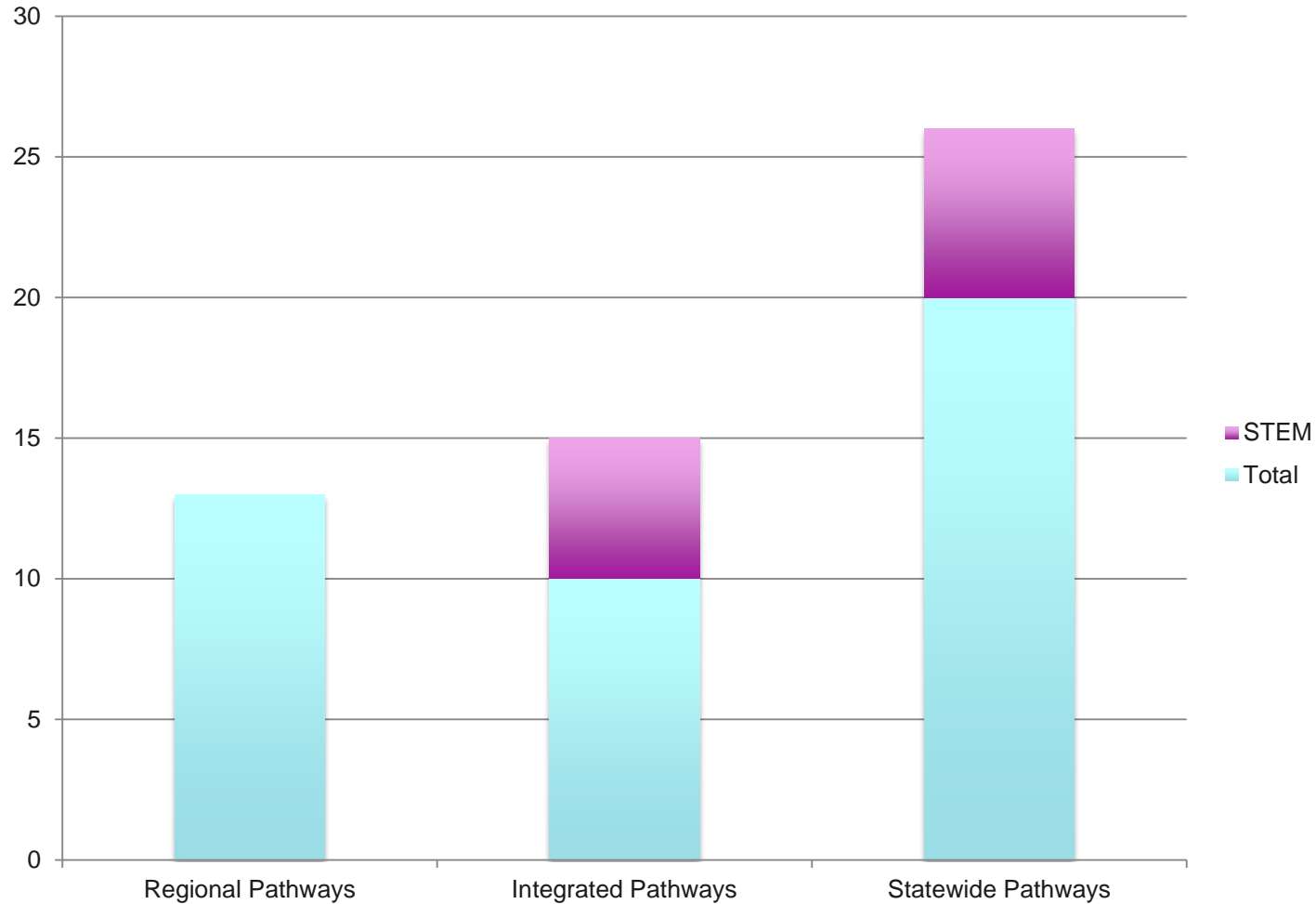Categories (left to right):
- Architecture and Engineering
- Arts, Design, Entertainment, Sports, and Media
- Business and Financial Operations
- Community and Social Services
- Computer and Mathematical
- Construction and Extraction
- Education, Training, and Library
- Farming, Fishing, and Forestry
- Healthcare Practitioners and Technical
- Installation, Maintenance, and Repair
- Legal
- Life, Physical, and Social Science
- Management
- Production

The Lack of Current Offerings

Louisiana Believes

The Lack of Current Offerings

HS Course Enrollments in 2016
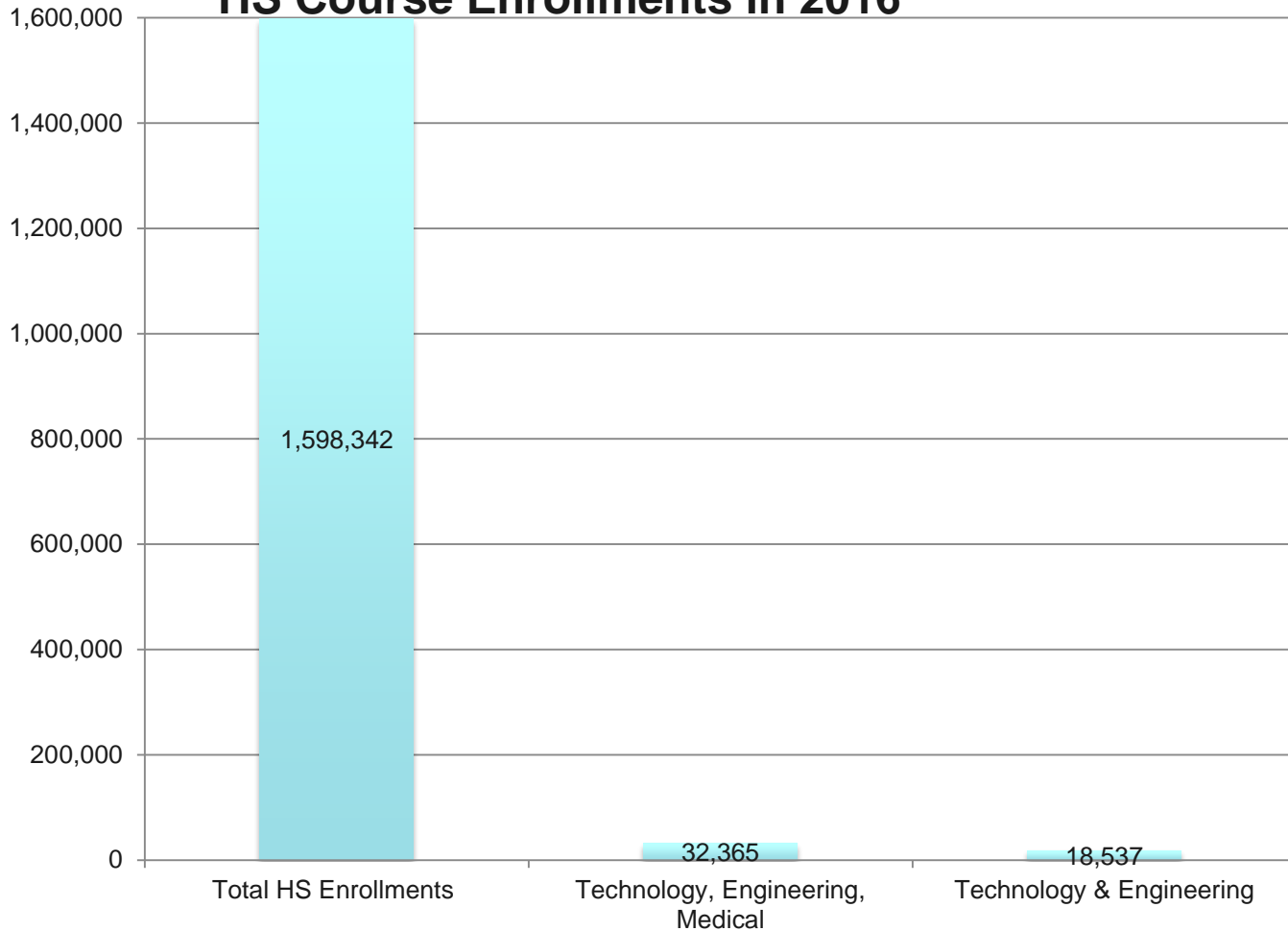
Bar chart showing Total HS Enrollments 1,598,342; Technology, Engineering, Medical 32,365; Technology & Engineering 18,537.

Louisiana Believes

Agenda

- **Why focus on STEM?**

- **Current K-16 JumpStart Pathways**

- **Future Vision and Next Steps**

STEM Pathways

LSU Pathways

- Pre-engineering
- Digital Design and Emergent Media
- Biomedical
- Computer Science

These STEM Pathways are being developed through a partnership of:

- LSU Colleges (Engineering)
- LSU Gordon A. Cain Center for STEM Literacy
- Louisiana Department of Education
- Lee High School in East Baton Rouge Parish
- Cyber Innovation Center

LSU Pathway Goals

1. Design and release a comprehensive set of high quality, advanced STEM courses in four STEM-based fields under an open-source license that:
   - Provide students authentic, engaging interactions with science, math, and computer science content.
   - Allow students to investigate their interests in specialized STEM fields.

2. Provide Louisiana students the opportunity to enroll in a specialized progression of STEM-based courses to attain industry-promulgated credentials and university issued certificates of pathway completion under the JumpStart pathway structure.

3. Increase the number of teachers with the content knowledge and content pedagogy required to teach advanced STEM courses.

LSU Pathway Objectives – Common for all STEM Pathways

LSU Pathways will develop:

1. computational thinking and computer science skills
2. research, data management and analytical thinking
3. innovation, creativity, critical thinking, and problem solving
4. communication and collaboration
5. appropriate use of technology
6. professional ethics

In some cases, whole courses are dedicated to one or two of these skills. In other instances, the courses are developed with all 6 objectives interwoven throughout. The teacher materials for these courses will strategically call out when students are developing these common objectives.

STEM Pathways

Current Reflections

- Over 1700 students are currently enrolled in courses on an LSU STEM pathway
- 8 schools are implementing the LSU Pre-engineering Pathway
- 1 school is implementing the LSU Digital Design, Biomedical, and Computer Science Pathways
- Based on feedback, the structure of the first 4 LSU STEM Pathways have been revised
- While the LSU certificate of completion currently serves as the "credential," other credentials will be woven into the pathways

STEM Pathways

Opportunity to Dig In

- Review the structure for the LSU STEM Pathways. With your table, discuss one thing you like about the structure and one question you have about the structure.

LSU Pathway Logistics

Teachers

- Need 2 teachers per school to implement 1 pathway
- Must meet LSU graduate school enrollment requirements
- Preferably have experience teaching applicable math, science, technology, or design courses
- Have a strong desire to participate in the program

Training

- Teachers enroll in a "Professional Graduate Certification Program"
- The program includes 9 graduate credit hours each summer for 2 summers and 3 hours across the year (1x per month on Saturday) - 21 total graduate credit hours
- If desired, teachers can attend a 3rd summer and complete minimal fall/spring coursework to earn a master's degree

LSU Pathway Logistics

Costs

- Districts receive Career Development Funds per student, per course
- The Department is working with LSU to keep costs for the first summer of graduate courses at a minimal
- Districts pay $96 per student, per course
- Districts pay tuition for the 2nd summer of courses

Agenda

- **Why Focus on STEM?**

- **Current K-16 JumpStart Pathways**

- **Future Vision and Next Steps**

STEM Pathways

Vision for 2018-2019

- The curriculum for at least 30% of the LSU courses will be finalized and published in an open source format.
- LSU Pre-engineering will be implemented in 10 additional schools.
- LSU Digital Design and Emergent Media will be implemented in 5 additional schools.
- The LSU Biomedical and Computer Science Pathways will continue to be developed at Lee High School for scale out in the next 3 years.
- Other organizations (La Tech, PLTW, others) will design STEM pathways and submit for approval.

Thank you

Next Steps

- Identify 2 teachers per school for the Pre-engineering and/or Digital Design Pathways
- Identify/recruit potential students on both diploma tracks
- Complete this survey to let us know if you are interested in implementing an LSU STEM pathway in 2018-19.

Questions

Contact: Jill.cowart@la.gov