# Louisiana Believes

High School Math and STEM Updates: What is Currently Happening, and What Will Be Available for 2018-2019?

**January/February 2018**

**DEPARTMENT of EDUCATION**

# Session Overview

This year, schools began offering coursework such as Springboard Intensive Algebra I, Statistical Reasoning and Introduction to Engineering.

Participants in this session will discuss the findings from these implementations and the vision for 2018-2019 regarding high school math and STEM opportunities.

Louisiana Believes

# Vision

**Vision**: Every student in Louisiana, every day, builds their knowledge of the world, reads meaningful texts, expresses their ideas through writing and speaking, and solves complex math problems.

Louisiana Believes

# Agenda

- Springboard Intensive Algebra I

- Statistical Reasoning

- K-16 STEM Pathways

- Next Steps

# Springboard Intensive Algebra I

**The Case for Change**

- More than 8,000 9th grade students were not enrolled in Algebra I or a higher math course in 2016-2017
- The number of students successfully completing Algebra I by the end of 9th grade is consistently less than 60%
- Students who do not successfully complete Algebra I by the end of 9th grade have a lower probability of graduating and continuing their education after high school

# Springboard Intensive Algebra I

**Goal of the Pilot:** Increase the number of 9th grade students who successfully complete Algebra I

*Intensive Math Support*



**HIGH-QUALITY CURRICULUM** + **APPROPRIATE RESOURCES** (targeted diagnostics, coherent supports) + **EXTENDED TIME**

# Springboard Intensive Algebra I

**Logistics**

The Department and The College Board partnered to create a course specifically for struggling students called Springboard Intensive Algebra I. This new intensive course is only being piloted in Louisiana, by 100+ teachers across 80+ schools in 35 districts and 3 charter networks. This equates to 2000+ "struggling" students accessing Algebra I in 9th grade.

The pilot required 3 things:

- High quality curriculum (Springboard) with coherent, intensive supports
- Double-block of math
- Initial and ongoing teacher support

# Springboard Intensive Algebra I

**Current Reflections**

Successes
- Over 80% of teachers believe that the Springboard pilot approach is the right approach to helping students who struggle in math
- Over 75% of teachers in the pilot believe a 2-hour time block is the right amount of time
- Over 70% of teachers found the ongoing PD helpful

Challenges
- Teachers are often doing the work (reading items to students, walking students through the math step-by-step); over 70% report consistently leading students step by step through math problems
- Pacing is a struggle in some classrooms
- Teachers who did not have back-to-back blocks report that the disconnect causes loss of instructional time
- Teachers new to the Springboard curriculum tend to struggle more with implementing the intensive approach using the curriculum during the 1st semester
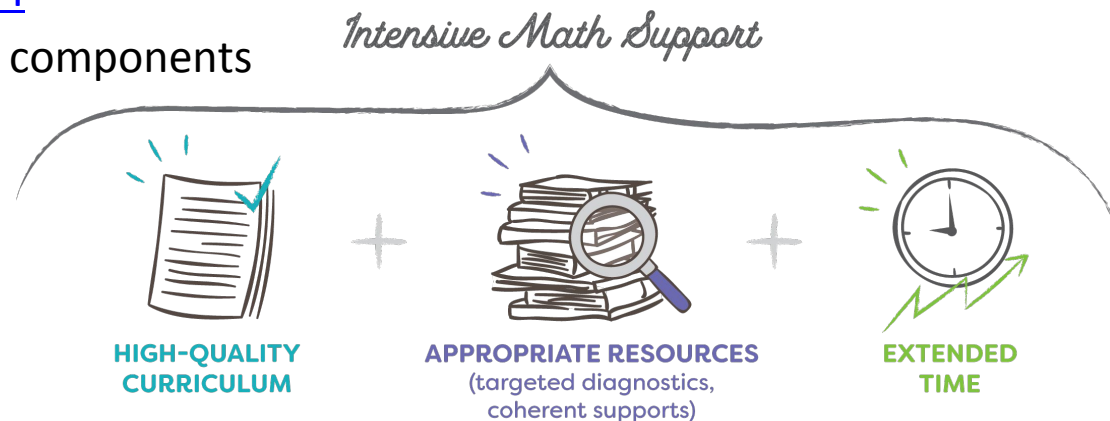
# Springboard Intensive Algebra I

**2018-2019**

Districts should have a plan to increase the number of 9th grade students who successfully complete Algebra I.

- Springboard Intensive Algebra I
- Eureka Algebra I with embedded ER Tools
- Agile Minds Intensified Algebra I

The plan should include all essential components pictured in the graphic.

*Intensive Math Support*

**HIGH-QUALITY CURRICULUM** + **APPROPRIATE RESOURCES** (targeted diagnostics, coherent supports) + **EXTENDED TIME**

**Next Steps:** Complete this survey if you are interested in accessing quality training on one of these programs. The Department will use the responses in planning for 2018-2019. You should/can use Redesign Funds to purchase the materials and the ongoing PD.

# Agenda

- Springboard Intensive Algebra I

- Statistical Reasoning

- K-16 STEM Pathways

- Next Steps

# Statistical Reasoning

**The Case for Change**

- Districts and schools have asked for math course options for students following Algebra I, Geometry and/or Algebra II
- Statistics, the science of understanding data, has become increasingly important in today's data-rich society
- A high quality, open source statistical reasoning curriculum does not currently exist

# Statistical Reasoning

**Goals of the Pilot**

- Increase the number of students exposed to reasoning around statistics
- Provide students who are not entering STEM fields an opportunity to study a math that is more applicable to their future path
- Test-drive and get feedback on newly developed lessons and units to publish them as a high quality, open source curriculum

# Statistical Reasoning

**Logistics**

The Department and LSU partnered to create the Statistical Reasoning course.

- Four teachers piloted the course with 11th and 12th grade students.
- The pilot provided initial and ongoing teacher support.
- Districts coded the course as Statistics and Probability, which counts for a core math on both diploma pathways.

# Statistical Reasoning

**Current Reflections**

- The course includes multiple opportunities for students to reason using mathematics they will see on the ACT
- Teachers feel this course is beneficial for students:
    - *I have already had one come thank me as her ACT Math score improved to a 27!*
    - *Their mid-terms indicate improved logic and improved writing skills for many.*

**Opportunity to Dig In**

- Analyze the given lesson and discuss with your table: What are students required to do in this lesson? How might doing this better prepare them for the ACT and/or their future engagement with math?
- Analyze the ACT standards alignment analysis and discuss with your table: Given this information, what profile of students at your school could most benefit from this type of course?

# Statistical Reasoning

**Vision for 2018-2019**

- The 2nd draft of the course is now being written. The course will be available in a clean, open source format.
- Statistical Reasoning will scale out to 50 teachers & in at least 50 schools; training will be provided by the Department.

**Next Steps**

- Complete [this survey](#) to let us know if you are interested in implementing the Statistical Reasoning course in 2018-19.

# Agenda

- Springboard Intensive Algebra I

- Statistical Reasoning

- K-16 STEM Pathways

- Next Steps

# K-16 STEM Pathways

**The Case for Change**

- Science and engineering jobs in the US are steadily increasing.
- Computer, mathematical, architectural and engineering jobs in Louisiana comprise the fastest growing sectors.
- According to a 2017 ACT report, 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%.
- Less than 25% of the current JumpStart pathways are STEM related fields.
- High quality, full-course, open source STEM curriculum is non-existent.
- Few high school teachers are engineers or specialists in other STEM-related fields. Current high school teachers must be adequately trained and must be given a high quality curriculum to provide opportunities to their students.

# 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

Louisiana Believes

# K-16 STEM Pathways

**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.

Louisiana Believes

# K-16 STEM Pathways

**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.

# K-16 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

# K-16 STEM Pathways

**Current Reflections from Students**

- *I like that it's simple enough that you don't have to spend weeks trying to figure out how to learn coding. You are spending 1 or 2 days writing something then you move on. Then all of a sudden it's like I realize I have accumulated a lot of things. It's a "Wow! I can do this really hard thing feeling!" (African American Female who had never coded before)*

- *I love that we see new careers and ideas each week. I never really knew what engineers did, now I want to know more!*

- *I like that we are being exposed to a lot of different subjects. I think it is good that we are seeing all of these different kinds of engineering because it kind of introduces us to real life problems.*

- *I have learned how to work as a part of a team. I now understand the importance of meeting project deadlines.*

- *I have learned that there are many ways to think about problems. I also learned sometimes you have to revise your work to make it work better!*

- *I learned that there are careers that I can do here (in Louisiana) that are pretty cool. I never knew that you could do jobs here (in Louisiana) that are let you make video games, design really cool machines, and help save lives through better house designs.*

# K-16 STEM Pathways

**Opportunity to Dig In**

- Review the current vision for the LSU STEM Pathways. With your table, discuss one thing you like about the vision and one question you have about the vision.
- Review the proposals for the Pre-engineering and Digital Design and Emergent Media pathways.

# STEM Pathways

**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

# K-16 STEM Pathways

**LSU Pathway Logistics**

**Costs**

- Districts receive Career Development funds per student, per course
- The Departments is working with LSU to keep the teacher stipend and/or graduation tuition and fees for the first summer at a minimal
- Districts pay $96 per student, per course
- Districts pay teacher stipend and/or graduate tuition and fees for the 2nd summer of courses

# K-16 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.

**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.

# Agenda

- Springboard Intensive Algebra I

- Statistical Reasoning

- K-16 STEM Pathways

- Next Steps

# Next Steps

1. Complete [this survey](#)* **by February 28** if you are interested in implementing Intensive Algebra I, Statistical Reasoning, or a STEM Pathway in 2018-2019.
2. Contact [jill.cowart@la.gov](mailto:jill.cowart@la.gov) with questions regarding any of these offerings.

*A PDF of the survey has been provided to help you coordinate responses within your district.