

# STEM

## A Collaborative Model

The Arkansas Department of Education



# ARKANSAS DEPARTMENT OF EDUCATION

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$\pi$

Division of Elementary and Secondary Education

Career and Technical Education

Arkansas School for the Deaf

Arkansas School for the Blind & Visually Impaired

Division of Higher Education

MLK Commission & Board

Arkansas State Library & Board

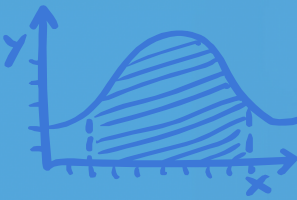
- Board of Education
- Fiscal & Admin. Services
- Educator Effectiveness
- Learning Services
- Public School Accountability
- Research and Technology
- Academic Facilities & Transportation
- AR Better Chance Program (Pre-K)

Career and Technical Education

Board of Trustees for ASD/ASBVI

Board of Trustees for ASD/ASBVI

- ADHE Coordinating Board
- AmeriCorps
- State Board of Private Career Education
- Veteran's Training & Education
- Northwest Technical Institute



DOE



$E = mc^2$





# STEM CTE Programs of Study

Career Cluster	Career Pathway	Programs of Study
Architecture and Construction	Design and Pre-Construction	<ol style="list-style-type: none"><li>1. Architectural CAD</li><li>2. Engineering CAD</li></ol>
Health Sciences	Biotechnology Research and Development	Biomedical Sciences (PLTW)
STEM (Science, Technology, Engineering, and Mathematics)	Engineering and Technology	<ol style="list-style-type: none"><li>1. Pre-Engineering</li><li>2. Pre-Engineering (PLTW)</li><li>3. Unmanned Aerial Systems (UAS)</li><li>4. Automation and Robotics Technology</li></ol>
Information Technology	Programming/Software Development	<ol style="list-style-type: none"><li>1. Computer Science: Programming</li><li>2. Computer Science: Networking/Hardware</li><li>3. Computer Science: Mobile Applications</li><li>4. Computer Science: Cybersecurity</li><li>5. Computer Science: Robotics</li></ol>

# Current Program Numbers

Program of Study	# of Schools	# of Students
Pre-Engineering	40	2923
Biomedical Sciences	15	932
Architectural and Engineering CAD	9	661
CS Mobile Application Development	14	912
CS Computer Engineering (Networking/Hardware)	2	223
CS Programming & Software Development	16	1174
CS Cybersecurity (pilot phase during Spring 2019)	6	379
Unmanned Aerial Systems (UAS) (released from pilot for start-up applications in Spring 2019)	8	1238
Automation and Robotics Technology (pilot phase during Spring 2019)	2	24
Engineering & Technology Education (ETE) (middle school course offerings)	13	2315
Gateway to Technology – PLTW (middle school course offerings)	41	8218
*Data from April 2019 Arkansas CTE Course Enrollment Reporting	<b>Total Students</b>	<b>18,999</b>

# Industry-Recognized Certifications

-  ArcGIS Desktop Entry Certification
-  AutoCAD Certified User
-  Autodesk Inventor Certified User
-  Autodesk Revit Certified User
-  Biomedical Assistant Credentialing Exam (B.A.C.E.)
-  Cisco Certified Entry Network Tech (CCENT)
-  Cisco Certified Network Associate (CCNA)
-  Cisco IT Essentials PC Hardware & Software Certification
-  Solid Edge Certified Associate
-  CLAD: Certified LabVIEW Associate Developer
-  CompTIA A+ Certification
-  CompTIA IT Fundamentals Certification
-  CompTIA Network+ Certification
-  CompTIA Security+ Certification
-  FAA Part 10 Licensure
-  Microsoft Technology Associate Advanced HTML5/CSS3 Certification
-  Microsoft Technology Associate CIW Web Foundation Certification
-  Microsoft Technology Associate JavaScript Specialist Certification
-  Microsoft Technology Associate Software Development Fundamentals Certification









Fort Smith, South Side High School's 1<sup>st</sup> Cohort of FAA Part 107 Licensed Pilots



**Russellville High School Computer Science Programming students demonstrate project for Secretary Key**

# Arkansas Technology Student Association



**National TSA Week,  
October 7-11, 2019**



For more information on Arkansas TSA visit: <https://www.arkansastsa.org>

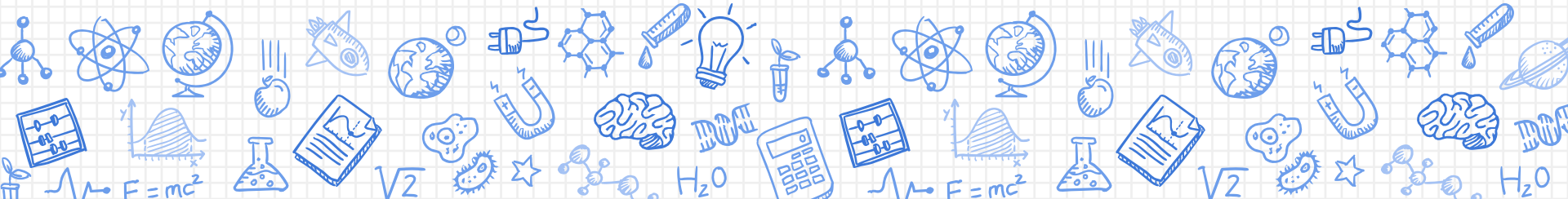
# Arkansas TSA

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# K-12 Mathematics Unit

Dr. Tina Moore  
DESE Math Program Manager









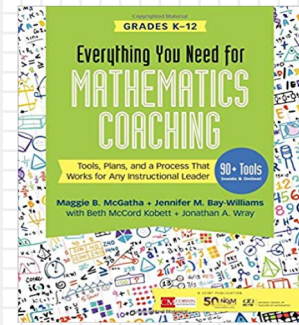
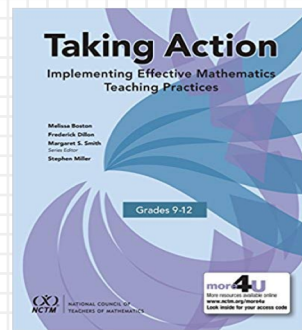
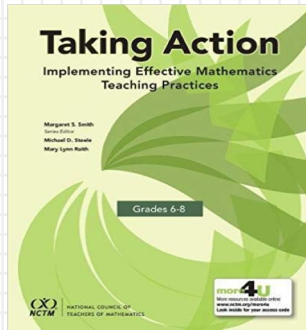
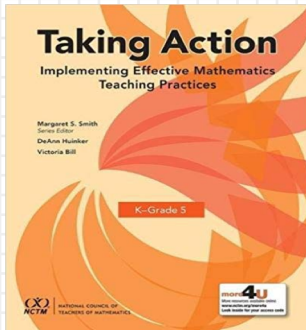






# AR Math QuEST

- 36 Hours of Face-to-Face PD Sessions
- Classroom-embedded Support
- Online support system for dialogue and feedback with and among teacher cohorts
- Book Study Webinars









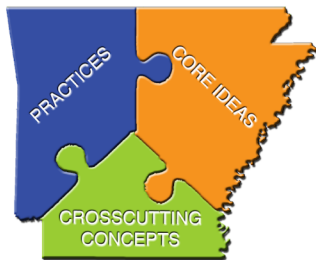
# GPS

## Grasping Phenomenal Science

Professional Development and Support for Arkansas Educators







# ARKANSAS

## K-12 SCIENCE STANDARDS

EDUCATION FOR A NEW GENERATION

### Science Graduation Requirements

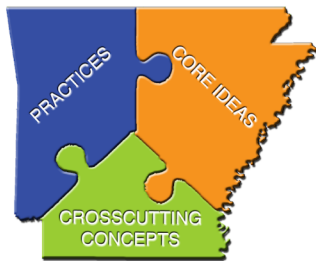
#### Science - 3 credits

ADE approved **Biology** – 1 credit

ADE approved **Physical Science** – 1 credit

ADE approved third science – 1 credit





# ARKANSAS

## K-12 SCIENCE STANDARDS

EDUCATION FOR A NEW GENERATION

# Science Standards & Courses

### Grades K-8



K-4 Science Standards Topics Arrangement



5-8 Science Standards Topics Arrangement

### High School



Biology



Chemistry



Physical Science - Integrated



Astronomy



Chemistry II



Earth Science



Environmental Science



Chemistry of Food



Physics



Human Anatomy & Physiology



CASE: Animal Science



CASE: Natural Resources



CASE: Plant Science



PLTW: Aerospace Engineering



PLTW: Human Body Systems



PLTW: Principles of Engineering



# Science Professional Development FY20 GPS System Products

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-  Introduction - 6 hour session
-  STEM Integration in K-2 Literacy - 6 hour session
-  STEM Integration in Grades 3-4 - 6 hour session
-  Unit Development - Two 6 hour sessions
-  Formative Assessment - 6 hour session
-  Science Investigations - 6 hour session
-  Evaluating Models, Inferences, and Experimental Results  
- 6 hour session
-  Interpretation of Data - 6 hour session
-  Scientific Argumentation - 6 hour session



# Benefits of Participation in GPS Follow-Up Support

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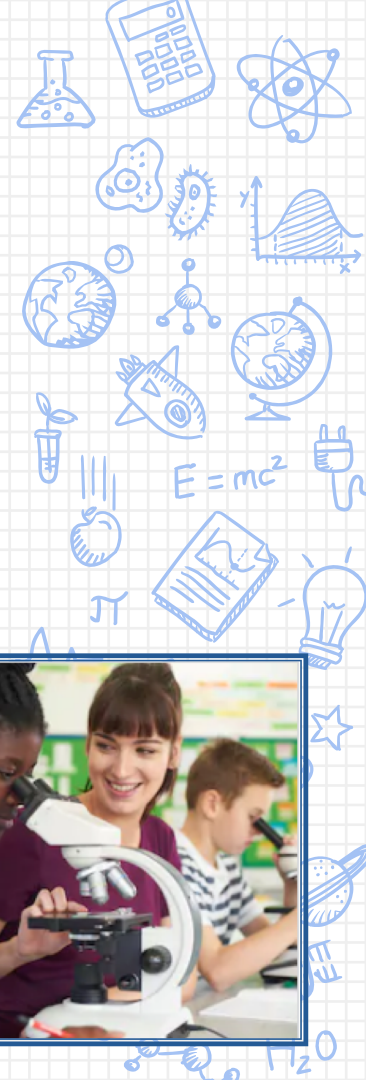
- Models the science practices assessed on ACT Aspire
- Targets depth of knowledge level 3 assessment tasks
- Supports connections to literacy and math standards
- Models strategies to increase student engagement
- Builds teacher leadership skills
- Provides collaboration among area science teachers which may be especially important for teachers in smaller districts
- Supports student growth in science with is a School Quality and Student Success (SQSS) indicator under Arkansas' Every Student Succeeds Act (ESSA) plan



# GPS Statewide Goals

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- 📌 Revise and present 9 GPS products
- 📌 Engage in PLC initiative, High Leverage Practices, & GUIDE for Life Skills
- 📌 Curriculum unit development - Formative assessment task development - Student work analysis
- 📌 Collaborate with ESC specialists
- 📌 Support ESC with community STEM partnerships
- 📌 Support districts in STEM education



# STEM Programs to Support Students

-  Real World Design Challenge
-  Moon to Mars (NASA)
-  Robotics Competitions
-  Science Fairs
-  STEM Competitions
-  Tinker Labs
-  National Youth Science Camp
-  Learning Blade



Real World  
Design Challenge



POWERED BY  
**STAR  
WARS**  
FORCE FOR CHANGE



 LearningBlade

# Student Involvement in STEM





## Test flight



**Alejandro Fierro**, a student at Siloam Springs Middle School, launches his plane in the air Thursday during the middle school flight competition at the 2019 Arkansas Technology Student Association Delta STEM Challenge in the Carl R. Reng Student Union on the campus of Arkansas State University. The Challenge featured eight Arkansas high schools with 85 students participating in a variety of competitions.

Quentin Winstine | The Sun

FRIDAY, FEBRUARY 8, 2019

## Fixing his plane



Quentin Winstine | The Sun

**Xavier Taylor**, a student at North Little Rock Center of Excellence, makes repairs to his handmade airplane he made for the flight endurance competition during the 2019 Arkansas Technology Student Association Delta STEM Challenge on Thursday in the Carl R. Reng Student Union at Arkansas State University. Taylor received some help and advice for his repairs from fellow competitor Dalton Szulita from Wynne High School.



## PLTW Engineering Completers

