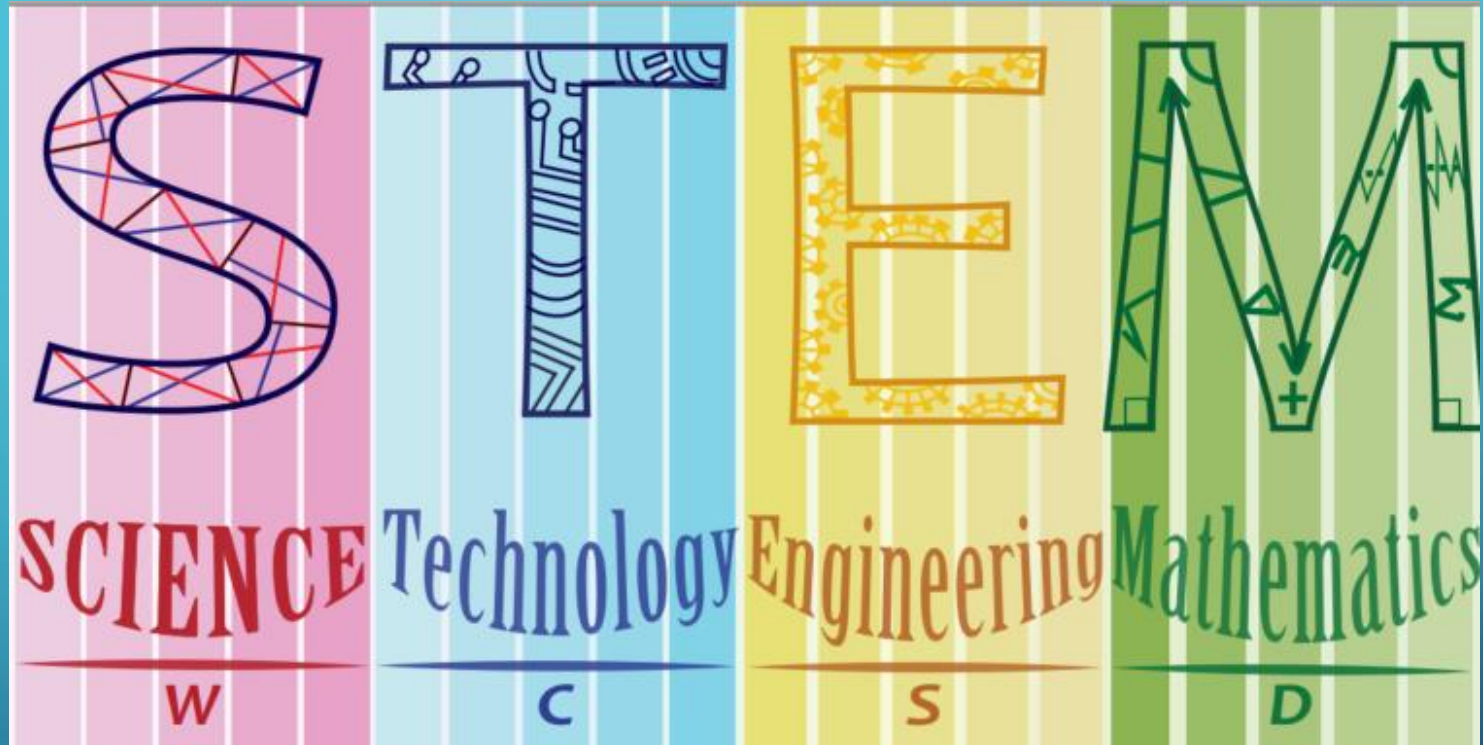


A decorative graphic on the left side of the slide, consisting of a network of light blue lines and small circles, resembling a circuit board or a stylized tree structure, extending from the top to the bottom of the frame.

STEM INNOVATION ACADEMY



STEM 21ST CENTURY SKILLS

- Critical Thinking & Problem Solving
- Initiative and Self-Direction
- Communication
- Collaboration
- Creativity and Innovation Skills
- Productivity and Accountability
- Managing Complexity
- Social and Cross-Cultural Skills
- Leadership and Responsibility
- Prioritizing, Planning, & Managing for Results

WHY STEM SKILLS MATTER?

- Job Market Trends
 - 17.3 million STEM jobs and continues to grow
 - 93 out of 100 jobs in STEM are above the national average in pay
 - STEM professionals on average earn 26% more than non-STEM workers
 - STEM employers looking for both technical and social skills



STEM INNOVATION ACADEMY'S GOAL

The goal of the STEM Academy program is to engage all learners in STEM. This goal is accomplished through a hands-on, project-based learning 'Creative Learning' system in which STEM disciplines, along with art, communications and social sciences are seamlessly integrated. It's a highly personalized approach that empowers students to shape their learning to meet their individual interests, abilities and learning styles.

WARREN COUNTY SCHOOL DISTRICT STEM PROGRAMMING

- Elementary
 - Creative Learning labs have a collaborative design using manipulatives to solve problems of increasing complexity
- Middle
 - Project Lead the Way curriculum
 - Design & Modeling, Medical Detectives, App Creators, and Robotics
- 9th Grade
 - Pre-STEM class
- 10th – 12th Grade
 - STEM Innovation Academy
 - 2 Career Tracks
 - Engineering & Industrial Technology (STEM Smartlab)
 - Arts & Communications (TV Studio)

STEM INNOVATION ACADEMY TRACKS

ENGINEERING & INDUSTRIAL TECHNOLOGY

- In-Depth Systems of Technology
- Robotics & Control Technology
- Future Tech & 3D Design
- Fabrication
- Coding and Programming
- Drone Technology

ARTS & COMMUNICATION

- Digital Media Arts/Communications
- Computer Graphics
- Film/TV Production, Directing, and Broadcasting
- Esports Marketing
- Audio Engineering
- Video Production
- Editing Digital Media

ENGINEERING & INDUSTRIAL TECHNOLOGY CAREER PATHWAY

Students will explore 8 Systems of Technology

- Circuitry
- Computer Graphics
- Digital Communications
- Mechanics and Structures
- Robotics and Control Technology
- Scientific Data and Analysis
- Software Engineering
- Sustainability

ENGINEERING & INDUSTRIAL TECHNOLOGY CAREER PATHWAY

System Levels

- Foundational STEM
 - Orientation and introductory of the 8 systems with 10 day long activities (15)
 - Level 1 curriculum
- SmartLab Systems of Tech (Portion 1)
 - Chooses 4 systems to focus on to go in further depth
 - Level 2 and 3 curriculum
- SmartLab Systems of Tech (Portion 2)
 - Focuses on remaining 4 systems to go in further depth
 - Level 2 and 3 curriculum
- Exploring Future Technologies
 - Drones, Virtual Reality, and 3D Fabrication
- Innovation Capstone Project
 - Problem Solving Real-World Issues

CIRCUITRY

- Explored through electricity, pneumatics and microelectronics
- Develop an understanding of the scientific and technological principles underlying this system
- Design complex systems utilizing technology Advanced Circuitry Exploration System
- SmartLab Resources
 - Makey Makey
 - Conductivity Exploration Systems with Accessory Collection
 - Snap circuit rover
 - Snap Circuits Electricity Exploration Collection with Multimeter
 - Snap Circuits Green Energy Collection
 - Snap Circuits Extreme Microelectronics System
 - Digital Sandbox Programmable Microelectronics Systems
 - Arduino Programmable Microelectronics Systems
 - Curriculum and/or additional learning resources for all above listed items

COMPUTER GRAPHICS

- Explore areas such as graphic arts, image capture, photo processing and manipulation, animation and special effects
- Distinguish between, and effectively use, bitmap graphics (digital "painting"), and object-oriented graphics (computer-aided "drawing" or "CAD") applications
- Integrate computer graphics with other software applications to create advanced graphic and commercial art, websites and multimedia presentations

SmartLab Resources

360 Degree Camera System

Adobe Photoshop Elements Software Packages

Digitizing Tablets

Google Arts and Culture

Oculus Go VR headsets

Portable Lighting Studio

3D Printing System and TinkerCAD

Digital Still Motion Cameras

Doodle for Google Art Contest

Google SketchUp Software

Photo Tripod

Tech-4-Learning Introductory Graphics software packages

DIGITAL COMMUNICATIONS

- Communicate effectively utilizing single, blended, and advanced media
- Progress from developing core competencies in digital communications to the regular application of these tools
- Develop advanced communications skills through the integration of two or more media using technology-based tools
- Explore linear and interactive presentations and the applications for each piece of media

SmartLab Resources

Adobe Premiere Elements Software Packages

Flexible Video Arm and Clamping System

Tech-4-Leaming Claymation Animation Kit and Refill Kits

Frames Stop Motion Software

Comic Life Software

Digital Cameras

Digitizing Tablets

Padcaster and Photo Tripod

Portable Lighting Studio

Sound engineering collection

USB Microphone and Stand

Virtual Reality Viewing Systems

Google Sites Software for ePortfolio Creation

MECHANICS AND STRUCTURES

- Create and study structures and machines
- Hands-on learning engagements foster an understanding of simple and complex machines and structural physics

SmartLab Resources

- Engino Architecture Collections
- Fischertechnik Mechanics and Statics Collections
- West Point Bridge Designer
- Zoob Construction System for Rapid Visualization and Prototyping

ROBOTICS AND CONTROL TECHNOLOGY

- Design and program robotic systems to perform task-oriented challenges
- Explore logical programming and explore how sensors, electronic and computer controllers are used to manage complex mechanical processes

SmartLab Resources

- Lego EV3 Control System with Software
- Programmable drone systems
- Sensors to integrate with Lego EV3

SCIENTIFIC DATA AND ANALYSIS

- Collect experimental data using testing equipment and probe ware, typically linked with a computer controlled interface
- Analyze data to draw conclusions from experiments
- Engineer and test scale models and analyze materials and structure
- Collect and analyze experimental data to explore principles of science through hands-on, inquiry-based projects.

SmartLab Resources

- Astronomy Experiences with MicroObservatory
- Extreme Weather and Monster Storms
- Global Information Systems with Google Maps, Worldmapper, and the Welikia Project
- Fischertechnik Optics system
- Global Information Systems with ArcGIS
- Vernier Materials Analyzer

SOFTWARE ENGINEERING

- Create mobile and computer desktop applications
- Create interactive online greeting cards, and computer animations D
- Simulate real systems and processes, and even create basic computer games
- Create real desktop and mobile app games that can be published and sold

SmartLab Resources

- App Inventor Software
- Digital Sandbox Programmable Microelectronics Collections
- MIT Scratch Version 3 Software
- Stencyl Software
- Touch Develop Software

SUSTAINABILITY

- Alternative energy and power efficiency projects connect core academic content with 21st century skills through engaging, inquiry-based exploration
- Explore this exciting area technology with hands-on, minds-on activities connecting math, science, social studies and economics

Wind Energy Discovery Collection

Understanding wind turbines

Propeller blade design

Wind farm design

Electrolyzing water for hydrogen fuel

Storing Wind Power Hydrogen Fuel Cell Discovery Collection

Generating power from hydrogen fuel cells

Design a hydrogen highway

Hydrogen fuel cell race cars

Solar Energy Discovery Collection

Understanding photovoltaic cells

Solar Energy and High-Performance Homes

Solar cooker design and testing

Solar race car design and testing

ARTS AND COMMUNICATION CAREER PATHWAY

Creative Learning and Media Transformers Curriculum

- Introduction to Film and Television
- Film and Television Production I
- Film and Television Production II
- Acting and Directing for the Screen
- News Broadcasting
- Esports Marketing
- Video Production

FILM AND TELEVISION INTRODUCTION

- **Convey, Define and Interrupt a Director's Artistic Vision**
- **Create storyboards and screenplays**
- **Identify and create the shot types and camera movements**
- **Demonstrate Camera Composition**
- **Operate Digital Cameras**
- **Operate Audio Recording Devices**
- **Demonstrate a Novice Level of film editing using Adobe Editing Software**
- **Recognize and apply shot duration techniques**
- **Edit all forms of media in Adobe Software Program**
- **Using the server, create and set-up Media Editing/Adobe Projects**
- **Record/adapt to all video recording scenarios**
- **Audio record all audio scenarios**
- **Define, Convey and Interrupt the Director's Vision**
- **Perform all technical, creative, and executive staff positions**
- **Create Props and Costumes**
- **Identify/Apply Tools of the Actor**
- **Edit Raw Footage**
- **Mix multiple soundtracks**
- **Apply sound and special effects**
- **Operate all Cameras while exhibiting shot duration and proper Camera Composition**
- **Edit raw footage into a narrative**
- **Mix sound and apply special effects**
- **Create a media project that reflects all skills and strategies associated with each phase of media production**
- **Tell a story with a coherent and concise narrative**

FILM PRODUCTION

- Record/adapt to all video recording scenarios
- Audio record all audio scenarios
- Define, Convey and Interrupt the Director's Vision
- Perform all technical, creative, and executive staff positions
- Create Props and Costumes
- Identify/Apply Tools of the Actor
- Edit Raw Footage
- Mix multiple soundtracks
- Apply sound and special effects
- Operate all Cameras while exhibiting shot duration and proper Camera Composition
- Edit raw footage into a narrative
- Mix sound and apply special effects
- Create a media project that reflects all skills and strategies associated with each phase of media production.
- Tell a story with a coherent and concise narrative.
- Create a film and marketing campaign

ADVANCED FILM PRODUCTION

- Staff peers into production team members
- Define and understand 3 Phases of Production.
- Create a shooting Screenplay
- Create a Storyboard
- Pitch a film and budget
- Scout and secure shooting locations
- Create a Shooting Schedule
- Create a Production Design
- Direct and Produce during Phase I
- Record/adapt to all video recording scenarios
- Audio record all audio scenarios
- Define, Convey and Interrupt the Director's Vision
- Perform all technical, creative, and executive staff positions
- Create Props and Costumes
- Identify/Apply Tools of the Actor
- Identify any need "pick-ups" for additional footage necessary to fill and plot holes.
- Meet and adhere to Budget
- Meet and adhere to Shooting Schedule

ADVANCED FILM PRODUCTION

- Use Adobe Editing Software
- Make Editing Decisions
- Cut/Edit Action and Dialogue
- Set appropriate shot lengths
- Mix multiple sound tracks
- Redub Audio
- Utilize and Apply Sound and Special Effects during Postproduction
- Utilize and Apply appropriate style/design of titles/credits
- Utilize and Apply Editing Strategies/Techniques
- Devise a full marketing and promotional campaign

NEWS BROADCASTING

- Working understanding of all segment types.
- Script writing that serves a storytelling purpose.
- Mastery of Camera Operation
- Mastery of Audio Recordings
- Mastery of footage Editing (Adobe)
- Mastery of effective Voiceover recording
- Placement of segment within news broadcast
- Operate each piece of technology/equipment associated with each control room position.
- Demonstrate a mastery of each position's technological expectations, associated with each control room position.
- Demonstrate an ability to collaborate in the control room during a broadcast.
- Recognize the impact of technology upon reporting while understanding its application- but not a "crutch."

SCREEN DIRECTING AND ACTING

- Screen acting strategies
- Working understanding of technology's expectations and limitations
- Working understanding of set restrictions
- Use of acting tools
- Collaboration with crew and director
- Student will demonstrate a working understanding of storyboards, scripts and screenplays.
- Students will understand and demonstrate an ability to adjust acting performance based upon the angle and shot magnification of a scene
- Work collaboratively to create believable screen performances built upon original screenplays and or storyboards
- Recognize how the Director and Editor's roles impact the final outcome of their screen performance

ESPORTS MARKETING

- Built upon the industry standards
- Creating content that is interesting to watch with multi camera and broadcasters within esports competition
- Marketing through social media, film, and television to promote players and competition
- Teaches them how to market the players for scholarships and industry
- Investigate the roots of gaming
- Learn how to effectively shoutcast
- Digital citizenship and accountability
- Master the techniques needed to create content that entertains
- Leverage advertising, marketing, and social media by the content created

CAPSTONE PROJECTS

- Explore various STEM disciplines and career paths
- Take ownership of their education and future career path
- Develop critical workplace skills, such as effective oral communication, critical thinking, & more
- Produce Capstone Projects that align with any course
- Develop a professional portfolio of projects and outcomes
- Apply knowledge from coursework to conduct a school or community-based project

STEM VISITATION SCHEDULE 2021

- All Freshman would visit the STEM Innovation Academy tracks.
- Students interact with hands-on activities
- Freshman 2020-21 class numbers:
 - EMHS – 55 students
 - SAMHS – 36 students
 - YMHS – 58 students
 - WAHS – 158 students
- WAHS students in Computer 9 or Pre-STEM
 - Tour the STEM lab and TV studio
- Outlying Schools in Computer 9 or Pre-STEM
 - School breaks into 2 groups to tour the two spaces