Project Lead The Way

School Board Presentation

4/24/2017
AGENDA

Superintendent’s Goal #1: Continuous Improvement of Academic Performance

Introductions

John Taylor

PLTW: High School Engineering/Karting

Derrek Sorg, BDHS

PLTW: High School- Biomed

Liz Vanderveer, NGC

PLTW: Junior High Engineering/Robotics - Biomed

Lisa Beckwith, CHC

Questions
STEM Integration & PLTW in Wayne

Elizabeth Vanderveer, Lisa Beckwith & Derrek Sorg
Overview of STEM & PLTW in Wayne:

- **Ben Davis High School:**
  - Area 31 Career Center
  - Project Lead The Way Pathway

- **Ben Davis High School 9th Grade Center:**
  - Project Lead The Way Pathway
  - Biomedical Science

- **Chapel Hill and Lynhurst 7th & 8th Grade Center:**
  - Project Lead The Way Pathway
  - Medical Detectives

- **Wayne Township Elementary Schools:**
  - Ben Davis Conductors (FIRST Robotics Team)
  - Vex Robotics
  - Elementary Robotics Summer Program
  - WiRES -- Wayne-inspired Robotics for Elementary Students
1.1 million projected job vacancies in current decade (Indiana)

Demand of 123,000 STEM-related jobs by 2018 (Indiana)

550,000 Middle-skill job openings by 2020 (Indiana)

26 million jobs require significant STEM knowledge and skills (20% of all jobs in US)

Sources: Georgetown Center for Education and Workforce; Alliance of Science and Technology Research in America; National Skills Coalition; Indiana Department of Education; Bureau of Labor Statistics; Occupational Employment Statistics
Ben Davis High School:

- Area 31 Career Center:
  - 30+ programs with over 5,000 college credits earned each year
  - 1,200 students from 11 schools
  - Early College Program -- Opportunity for Associates Degree in:
    - Precision Machining, Aviation Maintenance, Culinary Arts, Pharmacy Technology
  - STEM Certified Facility
Ben Davis High School:

Project Lead The Way-- Engineering

○ Introductory Courses:
  ■ Introduction to Engineering Design
  ■ Principles of Engineering

○ Specializations:
  ■ Digital Electronics
  ■ Civil Engineering & Architecture
  ■ Computer Integrated Manufacturing

○ Capstone:
  ■ Engineering Design & Development

○ Approximately 400 Students
Ben Davis High School: Introductory Courses

- **Introduction to Engineering Design (IED):**
  - The Design Process
  - Technical Drawing Skills
  - CAD Modeling Skills
  - Computational and Analytical Skills
  - Professional Skills
  - Modeling in Engineering

- **Principles of Engineering (POE):**
  - Mechanisms and simple machines
  - Mechanical advantage
  - Energy sources and applications
  - Vectors, forces, and statics
  - Trusses
  - Material properties
  - Centroids
  - Tensile testing
  - Control Systems
Ben Davis High School: Specialization Course

- Civil Engineering and Architecture (CEA):
  - Residential Design:
    - Construction Costs
    - Energy Efficiency
    - Building Codes
    - Green and Sustainable Design
    - Building Systems
  - Commercial Design:
    - Building Loads
    - Land Surveying
    - Building Systems
    - Project Management
Ben Davis High School: Specialization Course

- Computer Integrated Manufacturing (CIM):
  - Manufacturing processes
  - Product design
  - Robotics
  - Automation
Ben Davis High School: Specialization Course

- Digital Electronics (DE):
  - Foundations of electricity
  - Design Process of Digital Circuits
  - AND, OR, INVERTER Logic Design
  - Boolean Algebra & K-mapping simplification
  - Design, Simulation, and Creation of digital Circuits
  - State Machine Programming
  - Field Programmable Logic Gate Array Programming
  - Programming and Utilization of Arduino
Ben Davis High School: Capstone Course

- Engineering Design and Development (EDD):
  - Engineering Design Processes
  - Project Management
  - Documenting an Engineering Design Process
  - Teamwork and Professional Skills
  - Problem Identification and Justification
  - Research
  - Intellectual Property
  - Project Proposals- Design
  - Preliminary Design Reviews
  - Prototyping
  - Testing a Prototype
  - Presenting the Process and Results
Ben Davis Ninth Grade Center

Elizabeth Vanderveer

PLTW Biomedical Science
Ben Davis 9th Grade Center:

Biomedical Sciences is a 4 year sequence of courses which allows students to investigate the roles of biomedical professions as they study the concepts of human medicine, physiology, genetics, microbiology and public health (pltw.org).

The 4 biomedical classes are as follows:
- Principles of Biomedical Science (PBS)
- Human Body Systems (HBS)
- Medical Interventions (MI)
- Capstone: Biomedical Interventions (BI)
Ben Davis 9th Grade Center:

What is it?

According to PLTW.org:

• “From the moment students walk into the classroom, they are immersed in the mysterious death of Anna and asked to investigate, document, and analyze evidence to solve the case. Case-based scenarios like this one span all PLTW Biomedical Science courses. Students explore a range of careers in biomedical sciences as they learn content in the context of real-world, hands-on activities, projects, and problems.” (PLTW.org)

According to my PBS students:

• “Biomed [PBS] is a mix of learning and fun! We learn about real life situations pertaining to death and health. The labs we perform always correspond to what we are learning. So we’re having fun with the labs while continuing our learning.”
Ben Davis 9th Grade Center:

**PBS Related Careers:**

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<tr>
<th>Professionals</th>
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<tr>
<td>911 Operator</td>
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<td>EMT</td>
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<td>Crime Scene Investigator</td>
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<td>Blood Spatter Analyst</td>
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<td>Forensic DNA Analyst</td>
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<td>Medical Examiner</td>
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<td>Endocrinologist</td>
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<td>Primary Care Physician</td>
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<td>Certified Diabetic Educator (CDE)</td>
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<td>Clinical Researcher</td>
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<td>Podiatrist</td>
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<td>Psychologist or Psychiatrist</td>
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<td>Phlebotomist</td>
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<tr>
<td>Hematologist</td>
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<tr>
<td>Clinical Genetician</td>
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<td>Cardiovascular Technologist or Technician</td>
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<tr>
<td>Nuclear Medicine Technologist</td>
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<tr>
<td>Clinical Laboratory Technologist or Technician</td>
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<tr>
<td>Cardiac or Cardiovascular Nurse</td>
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<tr>
<td>Microbiologist</td>
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<tr>
<td>Medical Laboratory Technician</td>
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<tr>
<td>Food Scientist or Technologist</td>
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<td>Nutritionist or Dietician</td>
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Ben Davis 9th Grade Center:

**PBS units**

- Unit 1 The Mystery
- Unit 2 Diabetes
- Unit 3 Sickle Cell Disease
- Unit 4 Heart Disease
- Unit 5 Infectious Disease
- Unit 6 Post Mortem
Ben Davis 9th Grade Center:

What current PBS students tell you about the class:

- “It’s really interesting and fun if you pay attention and do your work.”
- “I would tell the ninth graders this is a very interesting class and if they want to learn about medical stuff they should definitely take this class.”
- “It challenges you, but it’s fun.”
- “It’s a really fun experience to take this class. You get to see how people find fingerprints, blood, food analysis, etc.”
- “I would tell them it is a really fun class and they would be glad they took it. If they are looking for a forensic career they should definitely take it.”
- “You learn about other science topics, not just about the crime scene all year.”
- “It isn’t a normal science class, it’s fun, and more hands on.”
- “It’s a class you have to work through. If you like solving situations then take the class.”
- “It’s a very rewarding class.”
- “You will learn about diabetes, carbs, specific jobs that are involved in a crime scene, and more!”
- “This is a far from boring class. Each new subject is interesting and diverse.”
Chapel Hill & Lynhurst 7th & 8th Grade Center:

- **Project Lead The Way Pathway -- Gateway**
  - Design & Modeling
  - Automation & Robotics
- **Medical Detectives**
  - 1st year of 4 year implementation
  - Chapel Hill is piloting 7th & 8th grade currently
  - Lynhurst will begin implementation in future year
- **Robotics Team**
  - Vex IQ Robotics Competition
  - Chapel Hill hosting Elementary Robotics Competition
PLTW: Design and Modeling

- What is engineering?
- Engineering Design Process
- Measurement
- Sketching and Dimensioning
- Designing for Production

Define the Problem

Identify Criteria & Constraints

Research & Brainstorm

Develop a Solution

Build a Prototype

Test & Refine
PLTW: Design and Modeling

- What is engineering?
- Engineering Design Process
- Measurement
- Sketching and Dimensioning
- Designing for Production
Chapel Hill & Lynhurst 7th & 8th Grade Center:

PLTW: Medical Detectives

Mysteries of the Human Body Systems

- Testing the senses
- Brain Anatomy
- Brain Dissection
- Mystery Disease
- Genetic Testing
PLTW: Automation and Robotics

- What is Automation and Robotics?
- Mechanical Systems
- Automated Systems
Robotics in Wayne

Lisa Beckwith & Derrek Sorg
Wayne Township Elementary Schools:

- **Elementary Robotics:**
  - Summer Academies since 2013
  - Pilot Elementary Program in 2014 (4 Schools)
  - 2nd Year of Elementary Programs (8 schools) with 2 schools competing in the Mayor’s competition.
  - Annual district wide robotics competition

- **WiRES:**
  - Wayne-inspired Robotics for Elementary Students
  - Goal: 12 Elementaries in 2016
  - 36 Vex IQ kits: 3 per Elementary School
  - Future outreach to other districts

- **Ben Davis Conductors:**
  - Rebrand and New Focus -- Leaders, Support, Structure, & Outreach
  - FIRST Robotics
Ben Davis High School / 9th Grade Center:

- Ben Davis Conductors:
  - Year Round Program
  - Fall Session
    - Practice Build
    - Skills Training
    - Safety
  - Spring Session
    - 7 Week Build Season
    - Competitions
  - Summer Session
    - Skills Training
    - Community Outreach
    - Program Support
Thank You for Attending!

Questions?