DEPARTMENT OF TECHNOLOGICAL STUDIES

PROGRAM OF STUDY

High Point Regional High School
Academic Year 2023-2024

"If we all did the things we are really capable of doing, we would literally astound ourselves…"

Thomas A. Edison

ITEEA STEM School of Excellence 2019-2020

ITEEA National Program of the Year 2006 & 2014

Table of Contents

Our Department

Our Philosophy:

Our Department of Technological Studies has been recognized as one of the leading programs on both the state and national level. Our distinguished teachers and rigorous curriculum provide a comprehensive education to our students, preparing them for a variety of options after high school including four and two year colleges, technical schools, and work. As the national momentum towards STEM Education and STEM Occupations thrive, our department continues to revise our curriculum to offer the most beneficial learning opportunities ***FOR ALL STUDENTS.***

Our Staff: Two Sussex County Teachers of the Year….Three High Point Teachers of the Year

- Mr. Brian Drelick (Supervisor of STEM) – bdrelick@hpregional.org
- Mr. Kevin Fenlon – kfenlon@hpregional.org
- Mr. Benjamin Kappler – bkappler@hpregional.org
- Mr. Alex Gonzalez – agonzalez@hpregional.org
- Mr. Paul Cardinal – pcardinal@hpregional.org
- Ms. Brooke Martin – bmartin@hpregional.org

Our History:

- Recognized at the state and national level as a leader in Technology Education
  - **ITEEA STEM School of Excellence – Inaugural Recipient 2019-2020**
  - Two time National Program of the Year from ITEEA
  - Two time State Program of the Year from NJTEEA
  - NJTEEA Five Star Program Recipient

Our Students

Their Successes:

- 35 New Jersey State TSA Championships and **3 TSA National Championships** since 2006
- National Recognition from Synergis for Architectural Innovations
- United States Patent for innovation developed in Engineering Design Tech. 2
- Media Program featured on local television and provides concurrent enrollment with local colleges
- Industry Certifications in Media, CADD, Architecture, OSHA, and Video Game Design

Their Future:

- Recent graduates are majoring in our related disciplines at these distinguished universities.

PENNSTATE 1855
NJIT New Jersey's Science & Technology University
STEVENS INSTITUTE of TECHNOLOGY THE INNOVATION UNIVERSITY 1870
THE UNIVERSITY of WISCONSIN MADISON
MILLERSVILLE UNIVERSITY OF PENNSYLVANIA of the State System of Higher Education 1855
R·I·T
CORNELL UNIVERSITY FOUNDED A.D. 1865
TCNJ The College of New Jersey
RUTGERS
VirginiaTech
NYU
NYIT NEW YORK INSTITUTE OF TECHNOLOGY
RENSSELAER POLYTECHNIC INSTITUTE 1824
INSTITUTE OF WENTWORTH TECHNOLOGY FOUNDED 1904
Pratt
UNIVERSITY OF MASSACHUSETTS AMHERST 1863
PHILADELPHIA UNIVERSITY 1884
Rowan University
LAFAYETTE
ITHACA
EMERSON COLLEGE
MANHATTAN COLLEGE
DAVE SCHOOL DIGITAL ANIMATION & VISUAL EFFECTS
PRINCETON UNIVERSITY

Our Facilities

1: Material Processing Lab
2: Engineering Lab
3: Engineering Lab
4: CAD/Architecture Lab
5: Media Studio

Pictured to the right:
Our department is home to six 3D Printers, an industry quality laser engraver, and a Large Format CNC ShopBot.

Electives Open to 9th Graders

Scheduling Tip:

Students and parents are encouraged to utilize the print and media resources provided to choose their 9th grade courses. We also recommend reviewing the High Point Pathways brochure to reference how these and other electives can be taken to strengthen the foundation for opportunities later in high school.

SEMESTER COURSES

(Half-year, 2.5 credits)

- *Architecture CP-A*
- *CADD 1 CP-A*
- *Engineering Design Technology 1 CP-A*
- *MakerLab CP-A*
- *Media Technology 1 CP-A*
- *Power, Energy, and Transportation Technology 1 CP-A*

FULL YEAR COURSES

(5 credits)

- Material Processing 1 CP-A
- Principles of Material Processing 1 CP-A

OUR COURSE SEQUENCE

Scheduling Tip:

Students are encouraged to enroll in multiple first level classes as a means of garnering greater exposure to multiple STEM areas. Enrollment in the higher levels of each sequence will enhance focus and complexity.

Program of Studies 2023-2024

TECHNOLOGICAL STUDIES — Supervisor Brian Drelick

COURSE SEQUENCE

TECHNOLOGICAL AND ENGINEERING STUDIES

- *Engineering Design Technology 1 CP-A*
- *MakerLab CP-A*
- *Power, Energy, & Transportation 1 CP-A*
- Engineering Design Technology 2 CP-A
- Power, Energy, & Transportation 2 CP-A
- Engineering Design Seminar Honors
- Engineering Design Capstone Honors

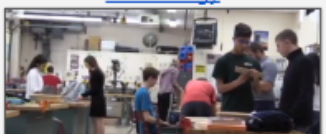
INDUSTRIAL AND VOCATIONAL STUDIES

- *Media Technology 1 CP-A* → Media Technology 2 CP-A → Media Technology 3 Honors (CE-SCCC) → Media Technology 4 Honors (CE-SCCC)
- *CADD 1 CP-A* → CADD 2 CP-A → CADD 3: Engineering Graphics Honors (CE-NJIT) → CADD 4: Adv. Engineering Graphics Honors (CE-NJIT)
- *Architecture CP-A* → Architecture 2 CP-A → Architecture 3 Honors → Architecture 4 Honors
- Computer Animation CP-A → Video Game Design CP-A
- Material Processing 1 CP-A → Material Processing 2 CP-A → Construction & Manufacturing CP-A (CE-SCCC) → Adv. Construction & Manufacturing CP-A (CE-SCCC) CP-A

ADDITIONAL OFFERINGS

- Biotechnology CP-A
- Principles of Material Processing 1 CP-A

Technology



BIOTECHNOLOGY I

TEC611 – CP-A – Gr. 10-12 – 5 Credits

The Content:

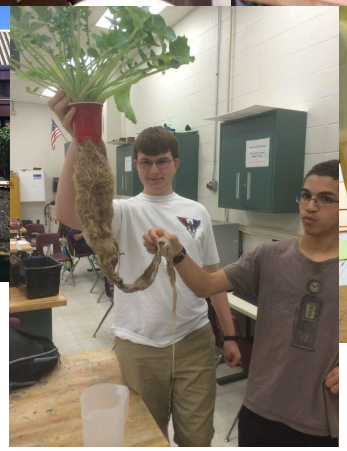
- Intro To Engineering Design Process
- Horticulture
- Biometrics
- Biofuels
- GMO's
- Environmental Remediation

The Experiences:

- Design, develop, and monitor a hydroponics system
- Design, develop, and test the functionality and versatility of prosthetic limbs
- Design, develop, and analyze a water purification system
- Generate alternative fuels

The Real World Value:

- Strong connection to real world problems
- Appreciation for environmental sustainability
- Real world application of STEM concepts with hands on exposure to science principles



COMPUTER ANIMATION

TEC629 – CP-A - Gr. 10-12 – 5 Credits

The Content:

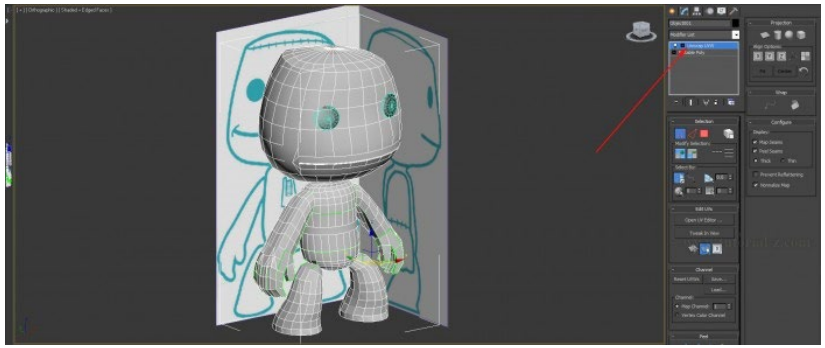
- History of 3D Computer Graphics.
- Digital workflows used to create scenes, characters, materials, lighting & animation.
- Reinforce computer skills and file management.

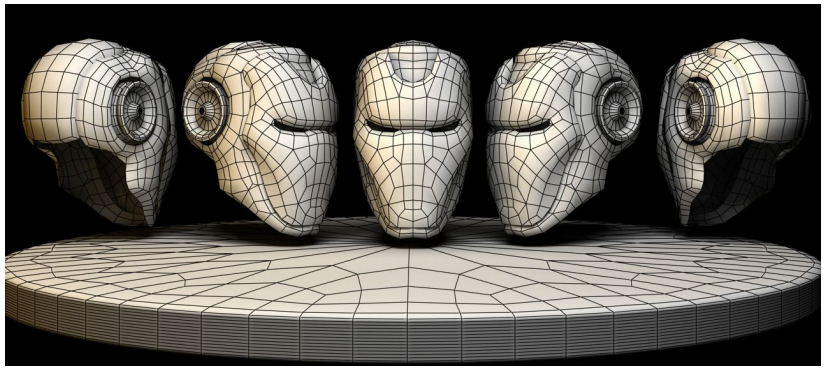
The Experiences:

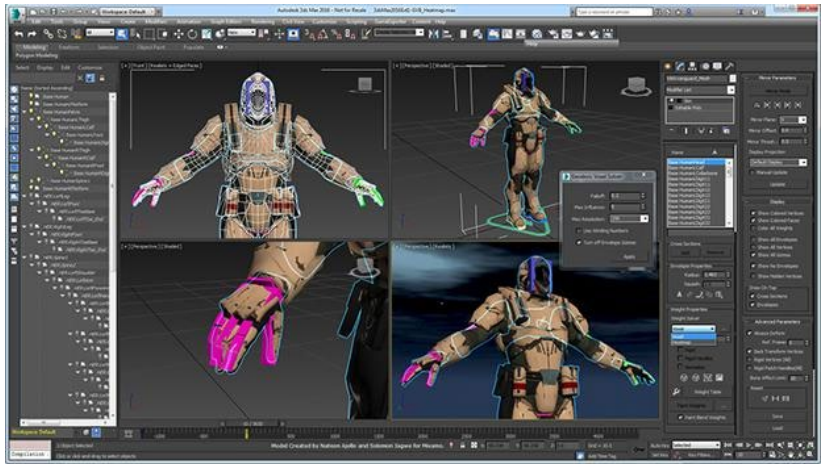
- Design and model characters, environments and scene assets.
- Create 3D animated shorts.
- Experiment with cutting edge virtual reality (VR) technology

The Real World Value:

- Prepare students for careers in game design, web design, graphic design, video production, animation and/or special effects, virtual set design, and digital special effects.







VIDEO GAME DESIGN

TEC660 – CP-A - Gr. 10-12 – 5 Credits

The Content:

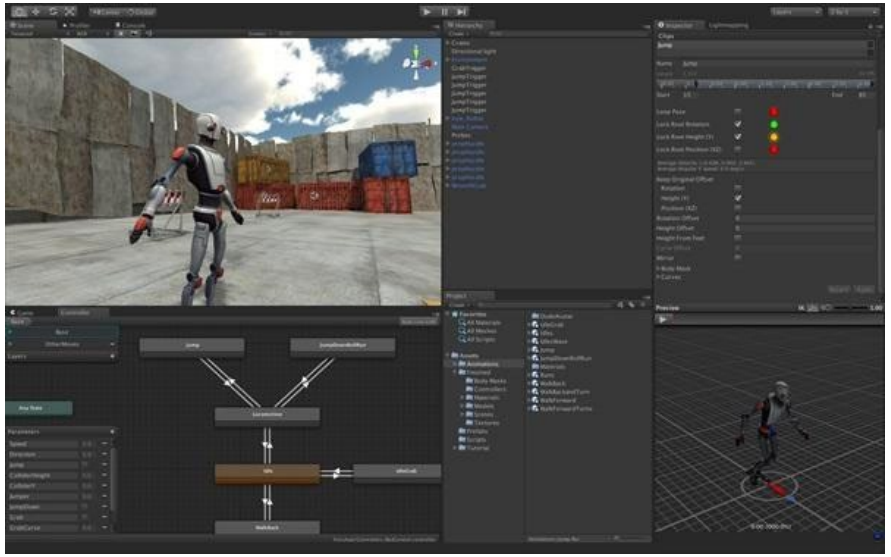
- History of modern video games.
- Digital workflows used to create projects, scenes, assets, lighting & games.
- C# Scripting, game programing and logic.

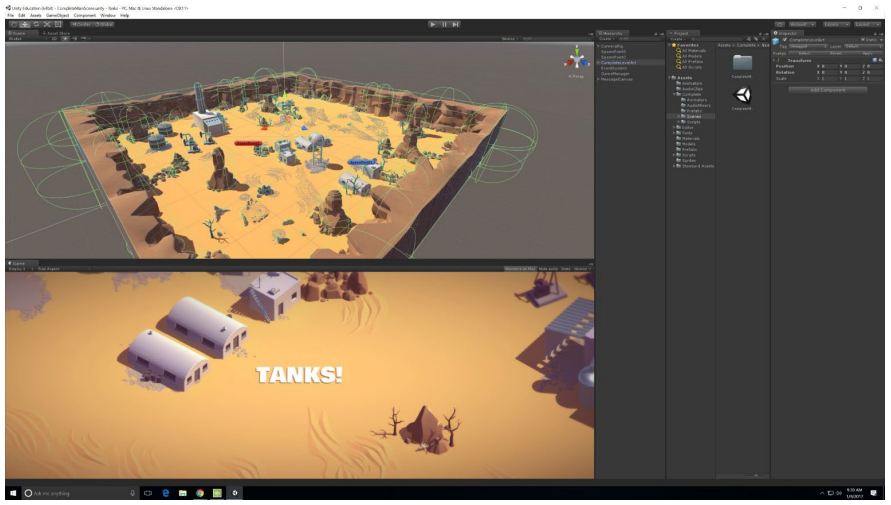
The Experiences:

- Design and build 2D and 3D games.
- Experiment with cutting edge virtual reality (VR) technology

The Real World Value:

- Prepare students for careers in game design, web design, graphic design, video production, animation and/or special effects, virtual set design, and digital special effects.
- Opportunity to earn Industry Certification.





ARCHITECTURAL DESIGN

SEQUENCE AND SUMMARY

Department of Technological Studies

ARCHITECTURE 1

TEC601S - CP-A - Grades 9-12 - 2.5 Credits

The Content:

- Green & Sustainable Architecture
- Reading Architectural Plans
- Site Design
- Residential Planning
- The Architectural Design Process

The Experiences:

- Create Building Information Models
- Design a passive solar structure.
- Design a green home for a set of clients.

The Real World Value:

- Introduction to Design
- Use real world architectural modeling software.
- Home planning and design

ARCHITECTURE 2

TEC602 – CP-A – Gr. 10-12 – 5 Credits

The Content:

- Elevations- Building forms and massing, buildings in elevation, fenestration, building proportions and people, materials and color.
- Building Sections – Reading and drawing sections, forces and structures, construction materials,
- Visualization – Architectural animation & rendering
- Individual & collaborative design projects

SYNERGIS
Engineering Design Solutions

The Experiences:

- Utilize advanced architectural software
- Compete in architectural design competitions

The Real World Value:

- Prepare for architectural related career paths.

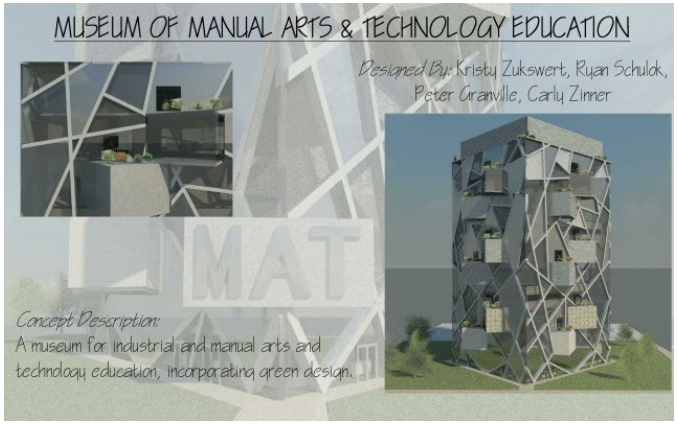
DISCOVER DESIGN: A Student Design Experience

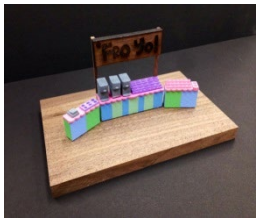
ARCHITECTURAL DESIGN 3

TEC603 – Honors – Gr. 11-12 – 5 Credits

The Content:

- Model making- hand, 3D printer, laser
- Design, planning, research, documentation, time management, group work & presentation skills
- Studio style setting
- Students work both independently and collaboratively on design projects





The Experiences:

- New Software
  - 3DStudio Max 2014
  - Sketchbook Designer
  - Adobe CS6 Photoshop, Illustrator
- Architectural competitions (different from prior year)

The Real World Value:

- Prepare for architectural related career paths.
- Opportunity to Earn Industry Certification.

TECHNOLOGY STUDENT ASSOCIATION ®

ARCHITECTURAL DESIGN 4

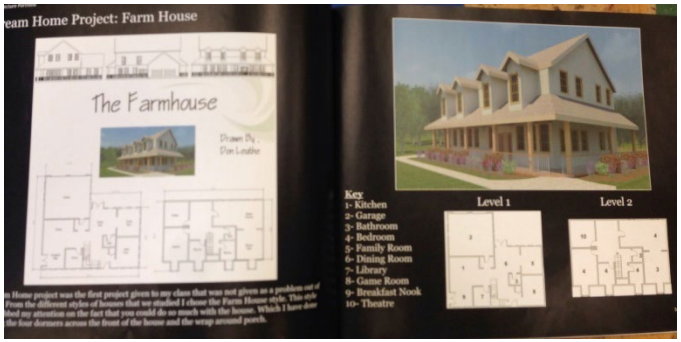
TEC604 – Honors - Gr. 12 – 5 Credits

The Content:

- Plan for life after High School (Trade School, College, University)
- Portfolio Development
- Real Life Projects
- Possible Independent Study

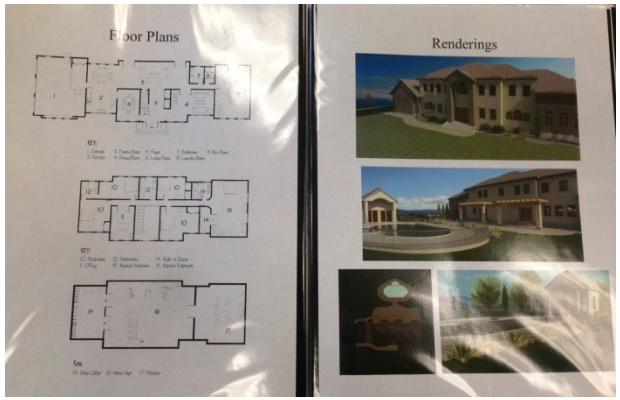
The Experiences:

- New Software
  - Adobe CS6 InDesign
  - Illustrator
- Real world design projects



The Real World Value:

- Prepare for architectural related career paths.



COMPUTER AIDED DRAFTING AND DESIGN

SEQUENCE AND SUMMARY

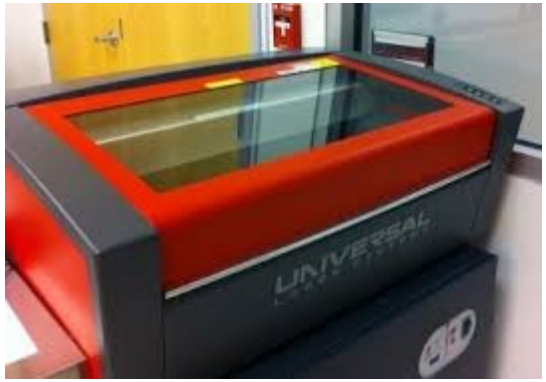
Department of Technological Studies

COMPUTER AIDED DRAFTING AND DESIGN (CADD) I

TEC621 – CP-A - Gr. 9-12 – 2.5 Credits

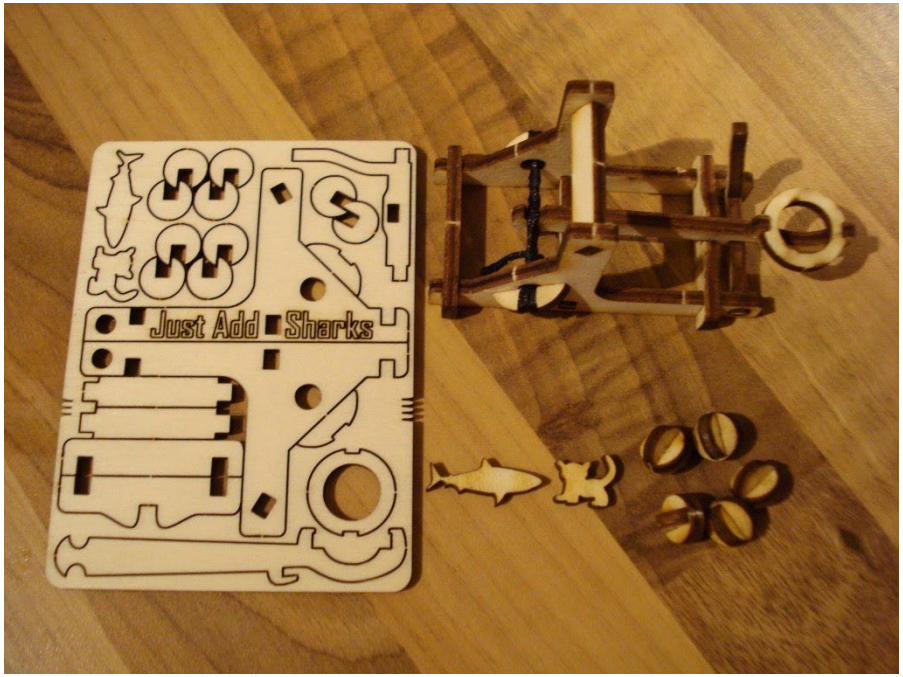
The Content:

- Intro to CAD Software
- 3-D Design
- Rapid prototyping



The Experiences:

- Utilize Laser cutter and engraver
- Design and prototype utilizing profesional software



The Real World Value:

- Intro to essential component of most industrial and engineering careers

CADD 2

TEC618 – CP-A - Gr. 10-12 – 5 Credits

The Content:

- 3-D Design & Rapid prototyping with
- Autodesk suite
- Adobe Suite

The Experiences:

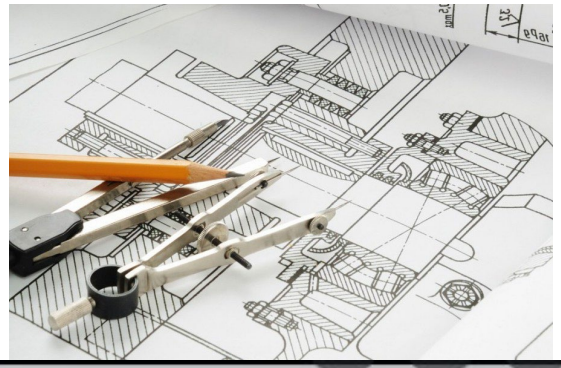
- Use multiple profesional software applications
- 3-D Printing
- Laser Cutting & engraving
- CNC utilization

The Real World Value:

- Complete in depth Design work and create professional level outputs utilizing multiple software applications and prototyping devices.

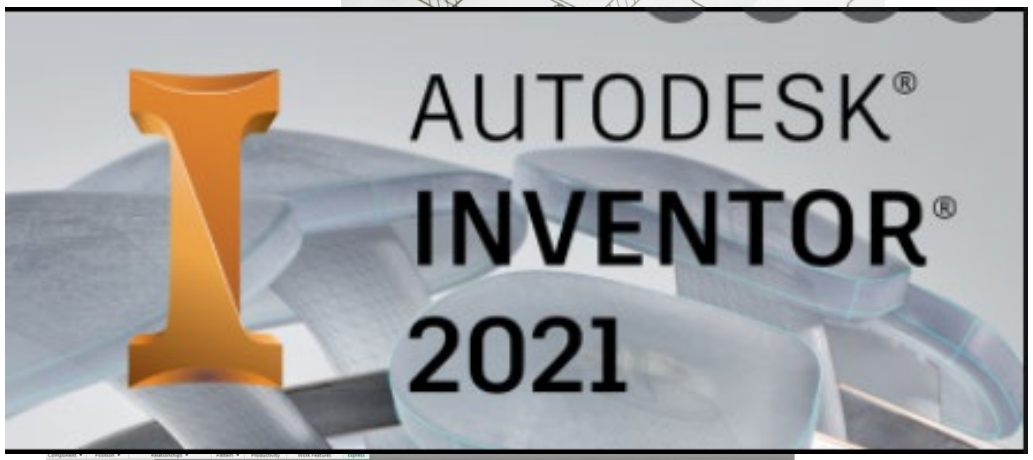
CADD 3: ENGINEERING GRAPHICS HONORS

TEC710 – HONORS - Gr. 11-12 – 5 Credits



The Content:

- In depth Overview of Autodesk Inventor
- Hand Drawing techniques
- Print reading



The Experiences:

- Students work through the NJIT intro to Inventor course

The Real World Value:

- Students can elect to receive Concurrent enrolment credit from NJIT
- Students will take Auto Desk Inventor Certification Test.

CADD 4: ADVANCED ENGINEERING GRAPHICS HONORS

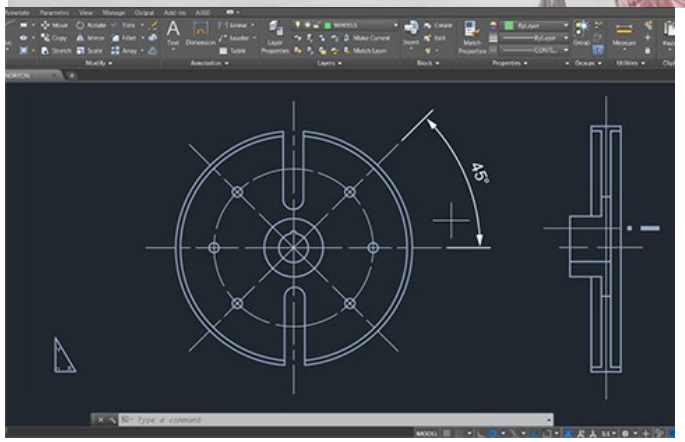
TEC711 – HONORS – Gr. 12 – 5 Credits

The Content:

- In depth Overview of AUTOCAD
- Hand Drawing techniques
- Print reading

The Experiences:

- Students work through the NJIT intro to AUTOCAD course



The Real World Value:

- Students can elect to receive Concurrent enrolment credit from NJIT
- Students will take Auto Desk AUTOCAD certification test.

ENGINEERING DESIGN TECHNOLOGY

SEQUENCE AND SUMMARY

Department of Technological Studies

MAKER LAB

TEC607 – CP-A - Gr. 9-10 – 2.5 CREDITS

The Content:

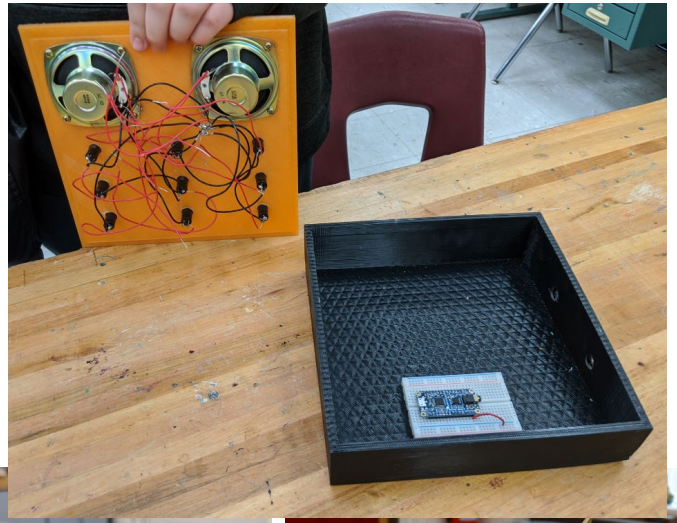
- Intro to Engineering Design Process
- Tinkering!
- How Stuff Works?
- What is the Maker Movement?

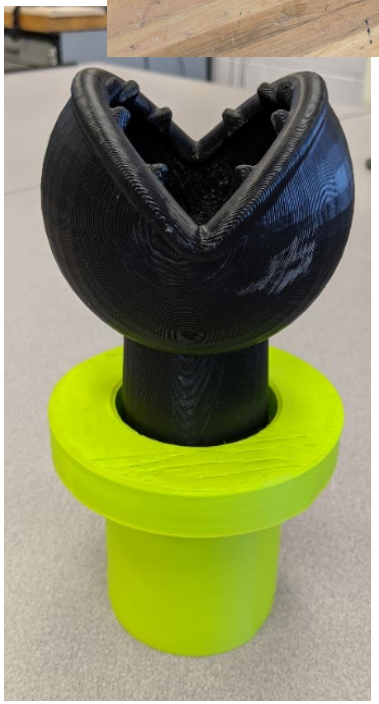
The Experiences:

- Prototyping and modeling with multiple materials
- Creation
- Exposure to diverse resources, including the 3D Printers and engravers

The Real World Value:

- Systems Thinking
- Teamwork
- Problem Solving



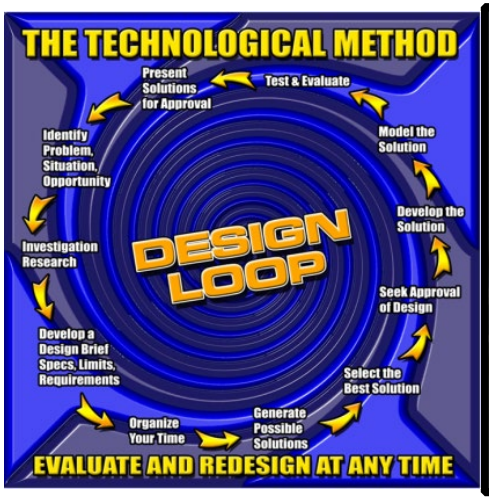


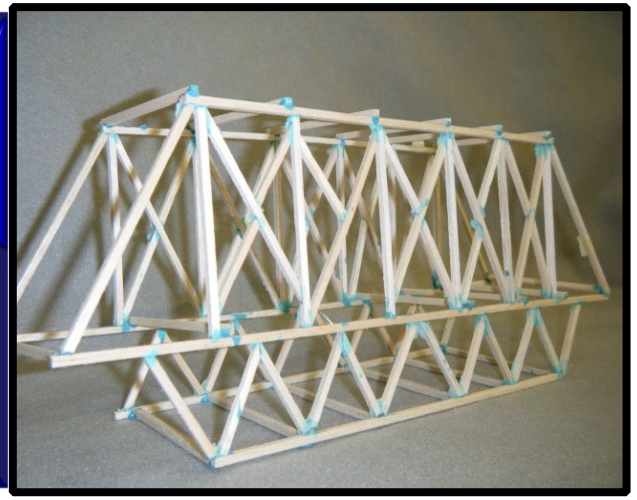
ENGINEERING DESIGN TECHNOLOGY I

TEC631 - CP-A - Grades 9-12 - 2.5 Credits
TEC631B - CP-A - Grades 9-12 - 5 Credits

The Content:

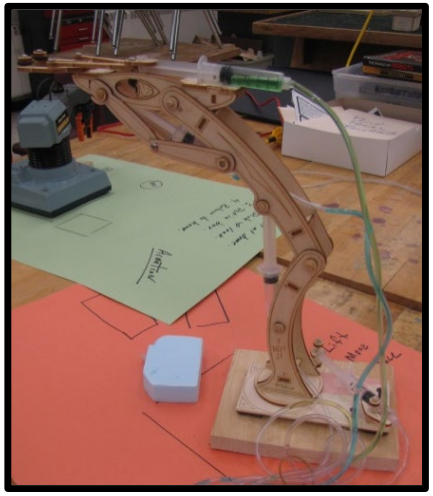
- Intro. To the Engineering Design Process
- Structural Design
- Fluid Power
- Robotics
- Teamwork





The Experiences:

- Design, build and test a bridge for strength
- Design, build and test a fluid controlled robot arm to solve a problem
- Work in teams
- Tools and machines



The Real World Value:

- Acquisition of core STEM principles
- Hands on, minds on learning
- Experience of working with others

ENGINEERING DESIGN TECHNOLOGY 2

TEC632 – CP-A / H – Gr. 10-12 – 5 Credits

The Content:

- Electronic Systems Design
  - Component identification and manipulation
- Mechanical Advantage / Gear Ratio
- Intro. To Robotics Programming and Design

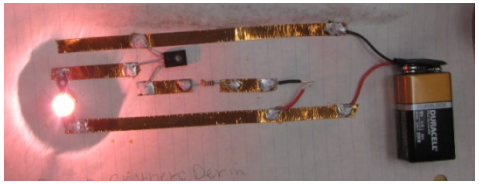
The Experiences:

- Design and develop of series of electronic circuits using a variety of components
- Design and develop a working sign applying electronic, structural, and mechanical concepts
- TSA – Engineering Design
- Program, design and develop a driver controlled robot to complete an obstacle course

EARNED A UNITED STATES PATENT

The Real World Value:

- Begin development of a graduation portfolio
- Core understanding of electronics
- Long term commitment to the design and problem solving process
- More time to apply core concepts
- Exposure to robotics and programming languages



LEGO mindstorms

ENGINEERING DESIGN SEMINAR

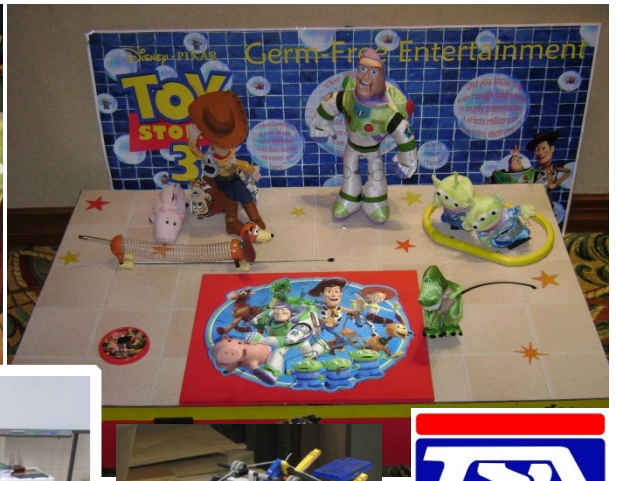
TEC649 – Honors - Gr. 11-12 – 5 Credits

The Content:

- Individual Accountability
- Advanced robotics programming and design
  - Intro to Autonomous Robotics
  - Intro to Arduino Technology
- Extensive application of mechanical, structural, electronic, and robotics concepts

Make:

instructables



TSA

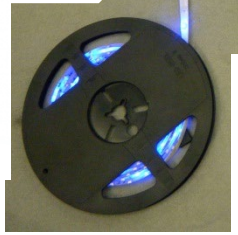
The Experiences:

- Design, develop, and PUBLISH a working prototype that reflects your individual personality
- Program, design, and evaluate the autonomous function of multiple robotic devices.
- TSA – Animatronics
- TSA – System Control Technology

The Real World Value:

- Diverse learning opportunities
- Participation in state and national competitions
- College level STEM experiences
- Extensive experience with robotics ar programming languages

ARDUINO



ROBOTC

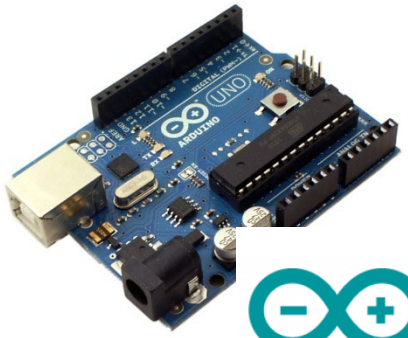
ENGINEERING DESIGN CAPSTONE

TEC650 – Honors - Gr. 12 – 5 Credits

The Content:

ROBOTC

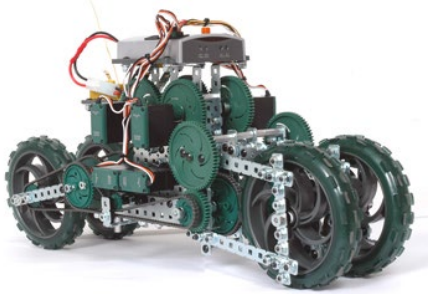
- Leadership and Mentoring Skills
- Career discussions and college ap support
- Advanced robotics
- Arduino application and design



ARDUINO

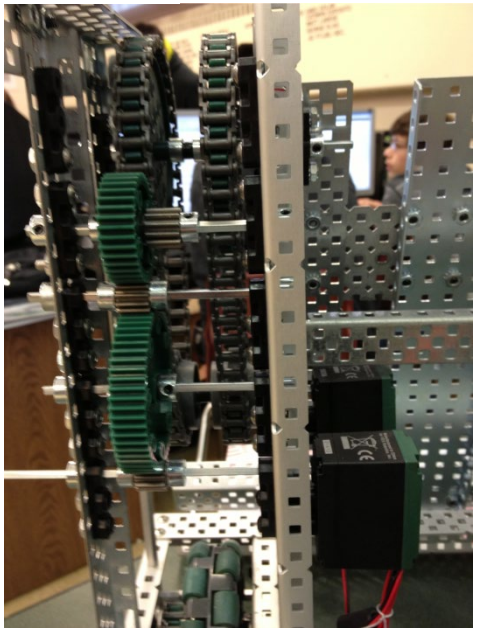
HIGH POINT REGIONAL HIGH SCHOOL
VEX ROBOTICS TEAM
VEX ROBOTICS COMPETITION
TSA TECHNOLOGY STUDENT ASSOCIATION
2012-2013
NEW JERSEY
STATE CHAMPIONS

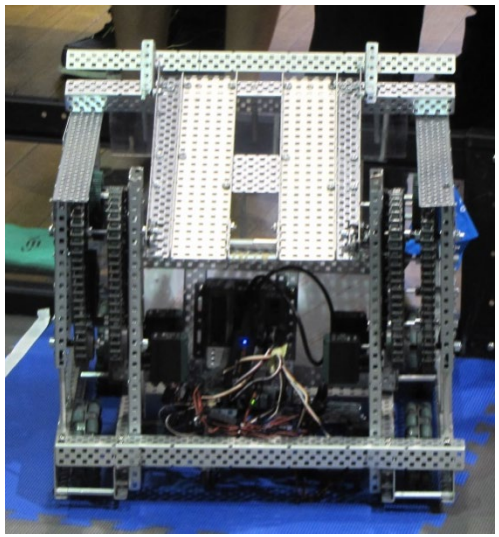
VEX ROBOTICS COMPETITION



The Experiences:

- Design and introduce learning experience for EDT III Students
- VEX Robotics
- Arduino and advanced Computer Programming
- Improving medical robotics through robotics
- Independent study opportunity





instructables

The Real World Value:

- Portfolio of all work completed upon graduation
- Opportunity to serve in leadership capacity
- Mastery of STEM skills in high school
- Potential to acquire industry certifications

Make:

MATERIAL PROCESSING / MANUFACTURING

SEQUENCE AND SUMMARY

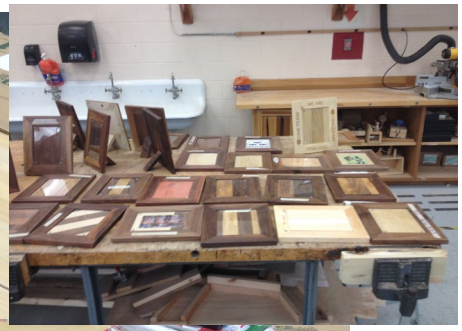
Department of Technological Studies

MATERIAL PROCESSING 1

TEC638 CP-A/B – Gr. 9-12 – 5 Credits

The Content:

- Introduction to Engineering Design Process
- Machine Operation
- Rapid Prototyping Systems
- Materials Properties
- Elements of Product Design
- Foundations of Manufacturing



The Experiences:

- Using multiple materials:
  - Construct an interactive tabletop game.
  - Construct a picture frame.
- Design and produce an age appropriate puzzle.

The Real World Value:

- Hands on problem solving
- Appreciation of diverse materials
- Safety awareness
- Collaboration in an industry setting

MATERIAL PROCESSING 2

TEC640 – CP-A - Gr. 10-12 – 5 Credits

The Content:

- Complex machine operations
- CNC Machine Operations
- Mass Production Techniques
- Industry manufacturing techniques

The Experiences:

- Students will utilize multiple materials to model and prototype solutions to different challenges
- Students will utilize CNC machines for mass production.
- Students will learn the quickest and efficient ways to construct a project.

The Real World Value:

- Exposure to multiple materials and their properties
- Exposure to industry techniques and machines.
- Manufacturing Job Opportunities.

CONSTRUCTION AND MANUFACTURING

TEC643 – CP-A – Gr. 11-12 – 5 Credits

The Content:

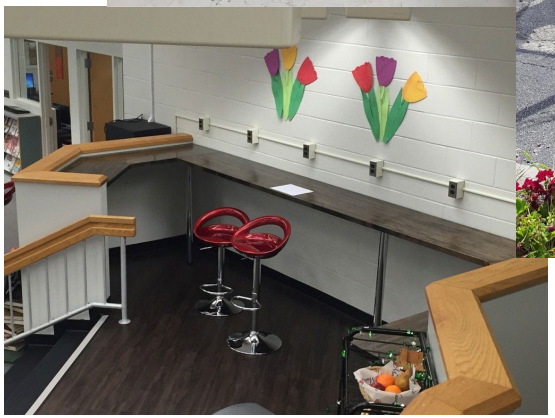
- Design a product to sell and make profit.
- Entrepreneurship
- Running a company within the school
- CNC Manufacturing
- Home Construction Skills

The Experiences:

- Students working together as a group
- Design and creating a company to make profit
- Product Design
- Marketing

The Real World Value:

- Manufacturers in New Jersey account for nearly 8 percent of the total output in the state, employing 6.7 percent of the workforce.



ADVANCED CONSTRUCTION AND MANUFACTURING

TEC644 – CP-A – Grade 12 – 5 Credits

The Content:

- Workplace Safety
- Construction and Layout
- Manufacturing Systems

The Experiences:

- Students can expand their interests and pursue individualized experiences
- Students will gain knowledge of industry practices & safety culture

The Real World Value:

- Concurrent Enrollment with SCCC
- Opportunity to earn Industry Standard OSHA Certification

MEDIA TECHNOLOGY

SEQUENCE AND SUMMARY

Department of Technological Studies

MEDIA TECHNOLOGY I

TEC630 – CP-A – Gr. 9-12 – 2.5 Credits
TEC630B - CP-A - Grades 9-12 - 5 Credits

The Content:

- Processes and operations necessary to produce videos.
- Proper camera operation, script writing, lighting, editing, and directing
- iLife suite applications

The Experiences:

- Moving still images into moving dynamic images
- Work with the core iLife applications
- Create films, publish blogs, web albums, and podcasts

The Real World Value:

- Media rich environment ideal way to connect with young learners
- Cross platform exposure to new technologies

MEDIA TECHNOLOGY 2

TEC635 – CP-A / H – Gr. 10-12 – 5 Credits

The Content:

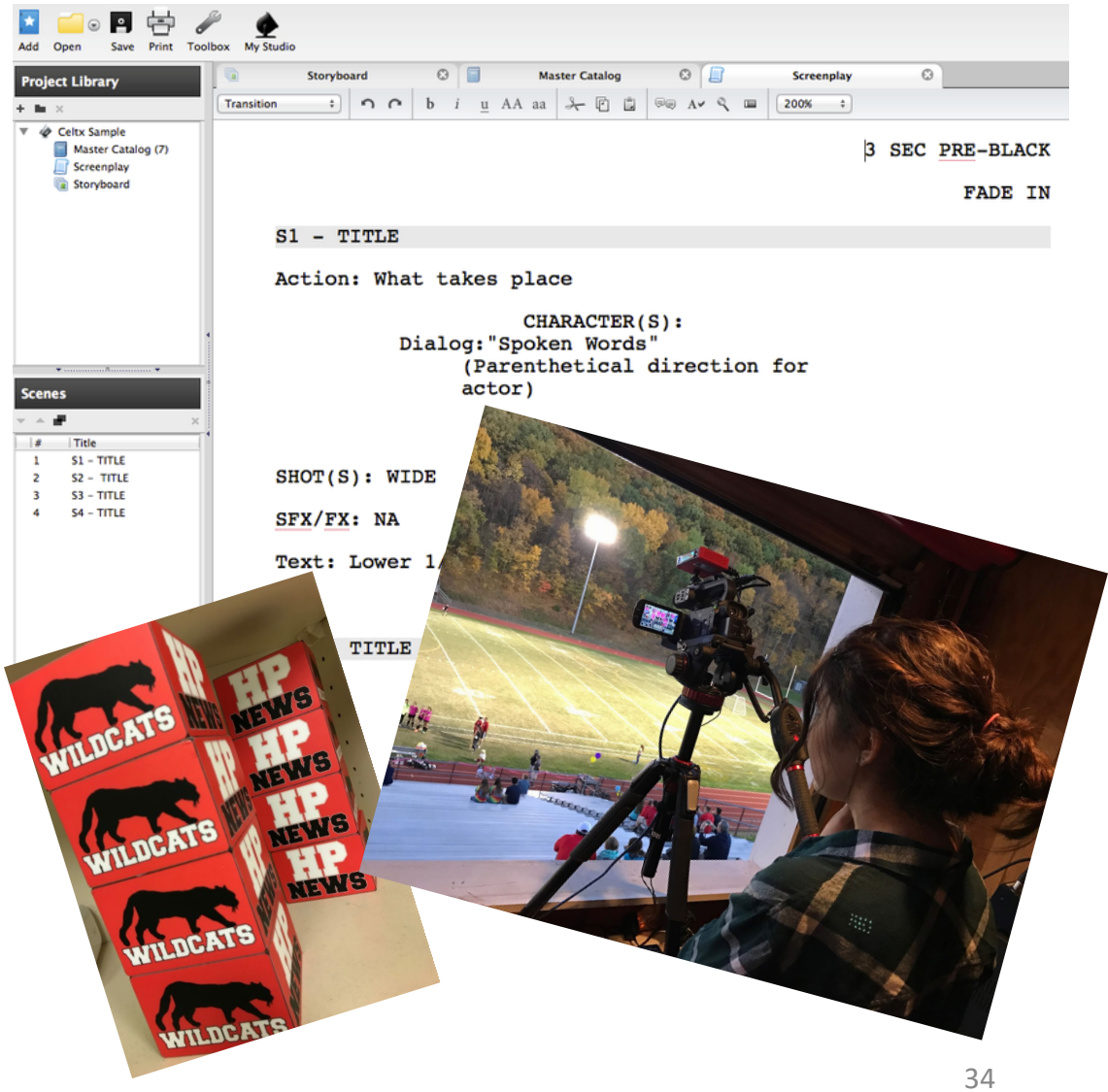
- Advanced techniques of digital video production
  - Three phases of the production process
  - Proper use of equipment
  - Processes used in digital video industry

The Experiences:

- Will produce monthly segments for the “Wildcat Report”
- Will produce music videos, sports highlights films, PSAs, commercials, contest, and various school and community based projects.

The Real World Value:

- Real world production meeting rigid deadlines and client needs
- Opportunity to earn Industry Certification

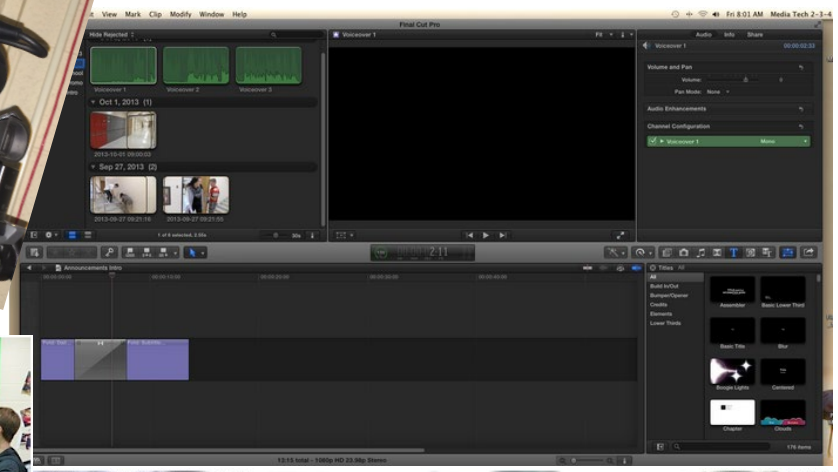


MEDIA TECHNOLOGY 3

TEC636 – HONORS - Gr. 11-12 – 5 Credits

The Content:

- Continue development of Final Cut Pro skills
- Based on Apple's Official Training Series
- Fundamental concepts and features for Apple's premier editing program



The Experiences:

- Part of the production crew for daily, morning announcements
- Several school and community projects
- Adherence to high standards and rigid deadlines

The Real World Value:

- Customized learning environment with rigor and relevance for the self motivated student
- Opportunity to earn Industry Certification

MEDIA TECHNOLOGY 4

TEC637 – HONORS – Gr. 12 – 5 Credits

The Content:

- Opportunity to master skills such as script writing, segment planning, storyboarding, crew and equipment familiarization, producing, researching a topic, keyboarding, writing, editing, teamwork and public speaking.

The Experiences:

- On-going development of high quality, full length video programs for public information broadcasting on cable television
- Students will direct and edit their own productions

The Real World Value:

- Strong teamwork
- Strict adherence to deadlines
- Self discipline
- Opportunity to earn Industry Certification

POWER, ENERGY & TRANSPORTATION

SEQUENCE AND SUMMARY

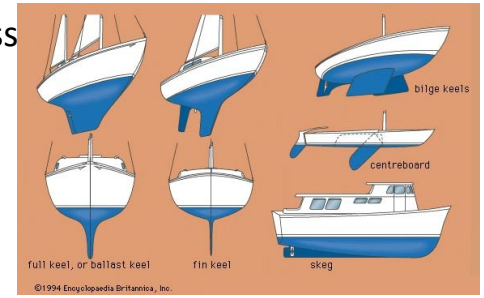
Department of Technological Studies

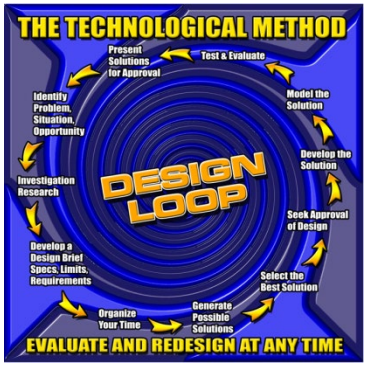
POWER, ENERGY, and TRANSPORTATION I

TEC651 – CP-A – Gr. 9-12 – 2.5 Credits

The Content:

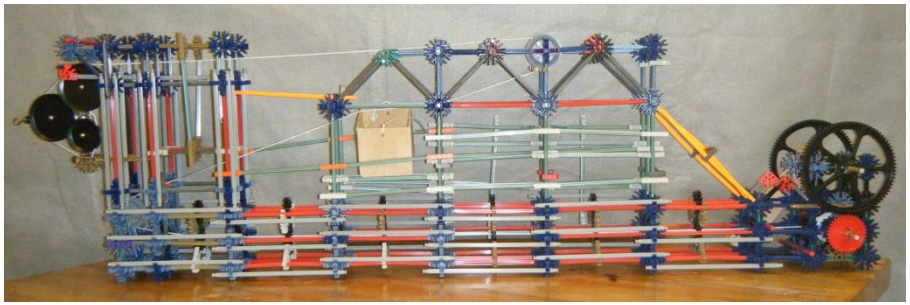
- Intro. To the Engineering Design Process
- Power Systems / Gear Ratio
- Land Transportation
- Alternative Energy – Solar Energy
- Internal Combustion Engines
- Marine Transportation





The Experiences:

- Design and develop a power system that will move the most weight the farthest distance in the shortest period of time
- Design, develop, and evaluate a hybrid vehicle that will travel a specified distance in the shortest period of time over multiple terrains
- Diagnose and run an internal combustion engine
- Design, develop, and evaluate a marine transportation vessel



The Real World Value:

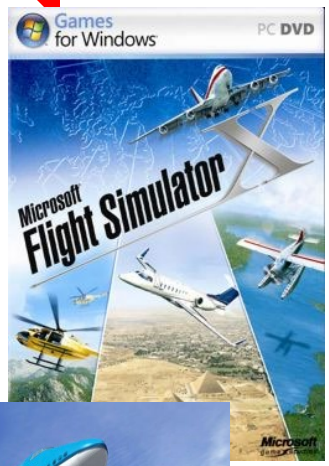
- Acquisition of core STEM principles
- Diverse, expansive curriculum
- Experience of working with others in a collaborative manner
- Hands on, minds on learning

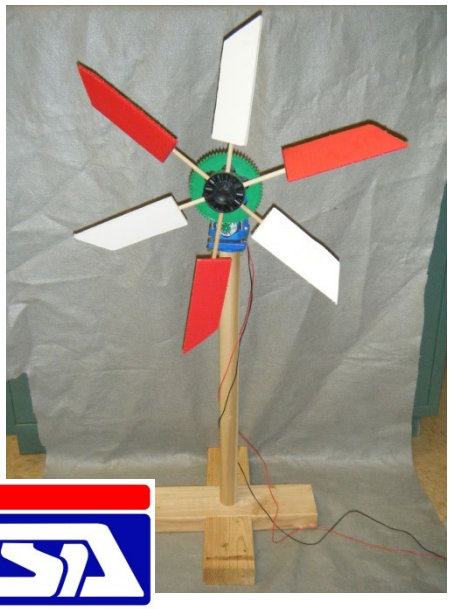
POWER, ENERGY, and TRANSPORTATION II

TEC652 – CP-A – Gr. 10-12 – 5 Credits

The Content:

- Principles of Flight
- Aviation Systems and Aircraft Design
- Alternative Energy – Wind and Solar Power
- Structures and Mechanisms





The Experiences:

- Design, develop, control, and evaluate multiple aircraft from diverse materials.
- Immersion in aircraft simulation software
- Design and develop a working prototype that addresses real world problem applying solar and wind power.
- TSA – Flight Endurance
- Preliminary Trials – Panasonic Design Challenge

The Real World Value:

- Reinforcement of core STEM principles
- Unique, focused curriculum with opportunity complete at state/national level
- Emphasis on aviation and Aerospace Engineering careers
- Begin work on graduation portfolio of all work