

Wilson Area School District Planned Course Guide

Title of Planned Course: Product Design and Manufacturing

Subject Area: Technology Education

Grade Level: 9 - 12

Course Description: In this course, students evaluate the concepts of going into business for themselves and working for or operating a small business. Emphasis is on the exploration of feasible ideas for products/services, research procedures, business financing, marketing strategies, and access to resources for starting a small business. Students develop components of a business plan and evaluate startup requirements prior to selling actual products. The class will be responsible for establishing and operating a business housed within the school. Prior to the end of the school year, students will sell products produced by their business and potentially make a profit based on individual financial investment. This course provides young entrepreneurs an opportunity to experience first hand the skills needed to run a successful business.

Time/Credit for this Course: 1 year / 1 credit

Curriculum Writing Committee: Erik Everett

Curriculum Outline

1. Introduction to Product Design & Manufacturing Topics

- A. Entrepreneurship
 - 1. Find a profitable idea
 - 2. Develop a product concept
 - 3. Validate your product
 - 4. Write a business plan
 - 5. Secure funding
 - 6. Launch your business
 - 7. Manage your business
- B. Business organization structures
 - 1. Sole proprietorship
 - 2. Partnership
 - 3. Limited liability company (LLC)
 - 4. Corporation
 - 5. Cooperative
- C. Business topics & vocabulary
 - 1. Budget
 - 2. Assets
 - 3. Shareholder
 - 4. Profit
 - 5. Profit margin
 - 6. Revenue
 - 7. Expenses
 - 8. Return on investment (ROI)
- D. Manufacturing History
 - 1. Industrial Revolution
 - a. 17th Century
 - b. Transition from man made to machine made
 - c. Steam Engines
 - d. Factories
 - e. Textile Machinery
 - 2. Assembly Line
 - a. Increased product output
 - b. Conveyor belts
 - c. Task-specific
 - 3. Lean Manufacturing
 - a. Reduction of waste & excess inventory
 - b. Just in time system
 - c. Automation
 - 4. Industry 4.0
 - a. Internet of Things (IOT)
 - b. Cloud Computing
 - a. Artificial intelligence
 - b. Smart Manufacturing
 - c. Robotics
- E. Manufacturing Processes
 - 1. Repetitive manufacturing
 - a. dedicated assembly/production lines

- b. production of the same or similar items
 - c. speed adjustability
 - 2. Discrete manufacturing
 - a. Adaptable assembly/production lines
 - b. Variety of setups and frequent changeovers
 - 3. Job shop manufacturing
 - a. Production areas
 - b. Smaller batches of custom products
 - c. MTO (Make to order)
 - d. MTS (Make to stock)
 - 4. Continuous process manufacturing
 - a. Runs 24/7
 - b. Oil refining, metal smelting, food production
 - 5. Batch process manufacturing
 - a. Driven by consumer demand
- F. Types of Goods
 - 1. Handcrafted
 - a. Hand tools (saws, hammers, chisels)
 - b. Woodworking machines
 - 2. Industrial (Machined goods)
 - a. 3D printing
 - b. CNC Router
 - c. Water Jet cutting
 - d. Laser Cutting
 - e. Vinyl printer

2. Product Ideation (Individual assignment)

- A. Preparation & Research
 - 1. Target Market
 - 2. Demographic
 - 3. Geographic
 - 4. Psychographic
 - 5. Behavioral
- B. Idea generation
 - 1. Brainstorming
 - 2. Mindmapping
 - 3. SCAMPER
- C. Idea Screening & Evaluation
 - 1. Feasibility
 - 2. Market Success
 - 3. Alignment with business objectives
- D. Application
 - 1. Brainstorming Jamboard
 - 2. Collaborative presentations
 - 3. Class Surveys (Google Forms)
 - a. Narrow down to 5 ideas

3. Skill sets for Product Design & Manufacturing

- A. Math Skills
 - 1. Measurement

- a. Customary system
 - b. Metric system
- 2. Fractions
 - a. Adding, subtracting, multiplying, dividing
- 3. Conversions
 - a. inches to mm & vice versa
 - b. Oz to gallons
- 4. Application
 - a. Measurement Worksheet
 - a. Lesson on measurement and application
 - b. Measurement Activity
 - a. hands-on measurement exercises on the actual material
 - c. Material cost analysis warmups
 - a. Sheet Goods
 - b. Liquids
 - c. Hardware
- B. Safety in Manufacturing
 - 1. NIOSH - Workplace safety research
 - 2. OSHA - Workplace safety enforcement
 - 3. Personal Safety
 - a. ear, eye, PPE (Personal protective Equipment)
 - 4. Hand Tool Safety
 - a. Utility / Exacto Knives
 - b. Hammers
 - 5. Machine Safety
 - a. Table Saw
 - b. Miter Saw
 - c. Jointer
 - d. Planer
 - e. Bandsaw
 - f. CNC Equipment
 - 6. Application
 - a. Safety review worksheets
 - b. Safety Tests

4. Product Concept (Group Project)

- A. Product Summary
 - 1. Features
 - 2. Aesthetic description
 - 3. Technical features
 - 4. Type of good
- B. Target Market
 - 1. Customer description
 - 2. Buyer Persona
- C. Manufacturing
 - 1. tools & machines
 - 2. Process of manufacturing
- D. Materials & cost
 - 1. Product breakdown structure
 - a. Raw materials

- 2. Bulk pricing
 - a. Supplier selection
- E. Prototyping
 - 1. consumables
 - 2. finished materials
 - 3. Working prototypes
- F. Unique value proposition (comparables)
 - 1. comparables
 - 2. Market survey
- G. Quantity, Pricing, & Profit
- H. Application
 - 1. Create groups of 5-6
 - 2. Develop a thorough presentation on product
 - 3. Survey target market
 - 4. Narrow down to a single product

5. Establishing a manufacturing startup

- A. Manufacturing organizational Structure
 - 1. Executive Team
 - 2. Plant managers
 - 3. Production Workers
 - 4. Quality Control
 - 5. Shipping & Receiving
- B. Interview Preparation
 - 1. Resume Writing
 - 2. Interview Agenda
 - 3. Hiring
 - a. Evaluations & Scoring
 - b. Discussion
- C. Business Plan
 - 1. Product description
 - 2. Product quick guide
 - 3. Investment quick guide
 - 4. Manufacturing overview
 - 5. Production timeline
- D. Startup capital (investments)
 - 1. Distributing information
 - 2. Acquiring investors
 - 3. Share distribution
- E. Application
 - 1. Careers in Manufacturing activity/worksheet
 - 2. Employee contracts
 - 3. Business plan presentation (Midterm)

6. Preparing for Production

- A. Production related team
 - 1. Final product design & Engineering
 - a. Prototype & survey evaluation
 - b. Design and computer modeling
 - c. Work flow chart

2. Raw material Acquisition & Processing
 3. Tooling
 - a. Jigs & fixtures
 - b. Ergonomic design
 - c. CNC programming
 4. Trial Run
 - a. Training
 - b. Testing production processes
 - c. Time motion study
- B. Management
1. Marketing & Advertising: Business & product related media
 2. Finance: Spreadsheets and procedures
 3. Sales: Digital and paper order forms
 4. Packaging & Delivery
 - a. package design
 - b. delivery plans

7. Daily Business operations

- A. Product quality control components
1. Inspection
 2. Testing
 3. Statistical Process Control
 4. Documentation & Records
 5. Corrective action
 6. Training & Education
 7. Continuous improvement
- B. Manufacturing productivity
1. Upskill employees
 2. Invest in maintenance
 3. Review workflow
 4. Target waste
 5. Improve communication
 6. Monitor Utilization
- C. Employee Evaluations
1. Employee self assessment
 2. Manager assessment
 3. Discussion
 4. Feedback / Goal setting
- D. Business Dissolution
1. Ownership approval
 2. Notify Employees
 3. Settle debts & Collect final payments
 4. Final product deliveries
 5. Sell or distribute assets
 6. Calculating final profit figures
 7. Distribute worker & share paychecks / gift cards
- E. Application
1. Worker Portfolio
 2. Employee Evaluation
 3. Hands-on job specific work

Curriculum Map

August:

Introduction to Product Design & Manufacturing Topics

September:

Introduction to Product Design & Manufacturing Topics

Product Ideation (Individual Assignment)

October:

Product Ideation (Individual Assignment)

Skill Sets for Product Design & Manufacturing

November:

Product Concept

Establishing a manufacturing startup

December:

Establishing a manufacturing startup

January:

Preparing for production

Daily business operations

February - June:

Daily business operations

Wilson Area School District Planned Course Materials

Course Title: Product Design and Manufacturing

Textbook:

- Manufacturing and Automated Technology

Supplemental Books:

- Innovation By Design
- The Art of Innovation

Teacher Resources:

(STEELS Standards) pdesas.org, inventionland.com, Libraryofcongressloc.gov, pbslearningmedia.org, due.com, thefutureorganization.com, humanresources.ku.edu, findlaw.com, ptc.com, simplilearn.com, shopify.com, coschedule.com, trupathsearch.com, sba.gov

Curriculum Scope & Sequence

Planned Course: Product Design & Manufacturing

Unit: Introduction to Product Design & Manufacturing Topics

Time frame: 4 weeks

STEELS Standards:

3.5.9-12.E - Evaluate how technology and engineering advancements alter human health and capabilities

3.5.9-12.F - Evaluate a technological innovation that arose from a specific society's unique need or want.

3.5.9-12.CC - Analyze how technology transfer occurs when a user applies an existing innovation developed for one function for a different purpose.

3.5.9-12.GG - Evaluate how technology and engineering have been powerful forces in reshaping the social, cultural, political, and economic landscapes throughout history.

3.5.9-12.HH - Analyze how the Industrial Revolution resulted in the development of mass production, sophisticated transportation and communication systems, advanced practices, and improved education and leisure time.

3.5.9-12.JJ - Identify and explain how the evolution of civilization has been directly affected by, and has in turn affected the development and use of tools, materials, and processes.

3.5.9-12.KK - Relate how technological and engineering developments have been evolutionary, often the result of a series of refinements to basic inventions or technological knowledge.

Essential content/objectives: At the end of the unit, students will be able to:

- Understand the course expectations and timeline for instruction.
- Understand the discipline policy that relates to behavior in this class.
- Identify the key components to becoming an entrepreneur.
- Describe different types of company organizations.
- Define and apply common manufacturing business vocabulary.
- Analyze how history has influenced changes in manufacturing.
- Identify the most popular manufacturing processes and where they are best utilized.
- Analyze different types of goods and how manufacturing methods can have an effect on product quality and manufacturing productivity.
- Describe the impact of the Industrial Revolution on mass production.
- Identify several pioneers in manufacturing.
- List several ways in which societal needs have led to technological innovation.
- Evaluate how technology and engineering advancements alter human health and capabilities.

Core Activities: Students will complete/participate in the following:

- Course introduction presentation & handouts
 - Class Syllabus

- Permission Slip
- Self Collage assignment
 - Independent Google Slide
- Entrepreneur research assignment
 - Lecture, class discussion, & note-taking
 - Independent Google Slide
 - Presentation on the career of one successful entrepreneur
- Business worksheet
 - Lecture, class discussion, & note-taking
- Manufacturing History & processes worksheet
 - Lecture, class discussion, & note-taking
 - Assembly line activity

Extensions:

- Current events
- Independent study
- Advanced hands-on application
- Compare hand-produced and mass produced items in homes

Remediation:

- Review
- Unit Terms and Questions
- Homework
- One-on-one re-teaching
- Supplemental reading
- Problem-solving

Instructional Methods:

- Direct instruction
- Demonstrations
- Labs
- Lecture
- Observation
- Peer-to-peer collaboration
- Group problem-solving

Materials & Resources:

- Google classroom assignments
 - Worksheets
 - Project templates
- Supplemental books
- Internet resources
- Video / Projector
- Classroom tools, machines, and Materials

Assessments:

- Unit quiz
- Class discussion (Question & Answer)
- Homework/classwork assignments

Curriculum Scope & Sequence

Planned Course: Product Design & Manufacturing

Unit: Product Ideation

Time frame: 2 weeks

STEELS Standards:

3.5.9-12.I (ETS) - Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

3.5.9-12.J - Synthesize data and analyze trends to make decisions about technological products, systems, or processes.

3.5.9-12.P - Apply a broad range of design skills to a design thinking process.

3.5.9-12.S - Conduct research to inform intentional inventions and innovations that address specific needs and wants.

3.5.9-12.U - Evaluate and define the purpose of a design.

Essential content/objectives: At the end of the unit, students will be able to:

- Develop an understanding of the market they have access to for selling products.
- Generate multiple product ideas through research-based ideation.
- Evaluate ideas based on project defined criteria and constraints.
- Utilize social skills necessary for productive collaboration.

Core Activities: Students will complete/participate in the following:

- Target Market Assignment
 - Lecture, class discussion, & note-taking
- Product brainstorming Jamboard
 - Independent research and application
- Product Google Form Survey
 - Student-led feedback on 3 ideas
- Collaborative idea presentations
 - Class discussion and feedback to select 5 products for further exploration

Extensions:

- Current events
- Independent study
- Advanced hands-on application

Remediation:

- Review
- Unit Terms and Questions
- Homework
- One-on-one re-teaching
- Supplemental reading
- Problem-solving

Instructional Methods:

- Direct instruction
- Demonstrations
- Labs
- Lecture
- Observation
- Peer-to-peer collaboration
- Group problem-solving

Materials & Resources:

- Google classroom assignments
 - Worksheets
 - Project templates
- Supplemental books
- Internet resources
- Video / Projector
- Classroom tools, machines, and Materials

Assessments:

- Unit quiz
- Class discussion (Question & Answer)
- Homework/classwork assignments
- Project Rubrics

Curriculum Scope & Sequence

Planned Course: Product Design & Manufacturing

Unit: Skill sets for Product Design & Manufacturing

Time frame: 3 weeks

STEELS Standards:

3.5.9-12.A - Use various approaches to communicate processes and procedures for using, maintaining, and assessing technological products and systems.

3.5.9-12.B - Critically assess and evaluate a technology that minimizes resource use and resulting waste to achieve a goal.

3.5.9-12. D - Critique whether existing or proposed technologies use resources sustainably.

3.5.9-12.AA - Safely apply an appropriate range of making skills to a design thinking process.

3.5.9-12.BB - Assess how similarities and differences among scientific, technological, engineering, and mathematical knowledge and skills contributed to the design of a product or system.

3.5.9-12.DD - Develop a plan that incorporates knowledge from science, mathematics, and other disciplines to design or improve a technological product or system.

Essential content/objectives: At the end of the unit, students will be able to:

- Utilize the Customary and Metric systems of measurement and present measurements in simplest form.
- Add, Subtract, and divide fractions and present them in simplest form.
- Model and compare values of integers, mixed numbers, fractions, and decimals.
- Analyze bulk material costs and quantities needed to produce a product.
- Apply nesting software to calculate material cost and reduce waste.
- Describe safety measures designed to protect workers in manufacturing.
- Define OSHA and describe how they work with NIOSH to protect workers.
- Demonstrate effective practice of eliminating hazards, poor decisions, and unsafe conditions that could lead to accidents.
- Safely operate a CNC laser engraver/cutter, CNC router, table saw, router, band saw, scroll saw, drill press, disk and belt sander, hand drill, etc.
- Safely use hand tools- hammer, screwdriver, hand saw, coping saw, hacksaw, sandpaper
- Evaluate which tools and machines can be used to achieve good results with minimal waste.

Core Activities: Students will complete/participate in the following:

- Measurement Worksheet
 - Lesson on measurement and application
- Measurement Activity
 - hands-on measurement exercises on actual materials
- Material Cost warmups
 - Group work, class discussion, & note-taking
- Safety in the workplace Worksheet

- Lecture, class discussion, & note-taking
- Safety demonstrations
 - Safety reviews (General & PPE, hand tools, machines, CNC)
 - Study Guide
- Machine selection and hands on lab work
 - Groups of 3
 - Machine and tool practice with teacher supervision

Extensions:

- Current events
- Independent study
- Advanced hands-on application
- Creation of a safety poster to improve lab safety
- Lab safety assessment

Remediation:

- Review
- Unit Terms and Questions
- Homework
- One-on-one re-teaching
- Supplemental reading
- Problem-solving

Instructional Methods:

- Direct instruction
- Demonstrations
- Labs
- Lecture
- Observation
- Peer-to-peer collaboration
- Group problem-solving

Materials & Resources:

- Google classroom assignments
 - Worksheets
 - Project templates
- Supplemental books
- Internet resources
- Video / Projector
- Classroom tools, machines, and Materials

Assessments:

- Measurement/material cost test
- Machine/tool Safety tests
- Class discussion (Question & Answer)
- Homework/classwork assignments

Curriculum Scope & Sequence

Planned Course: Product Design & Manufacturing

Unit: Product Concept

Time frame: 4 weeks

STEELS Standards:

3.5.9-12.M - Develop a device or system for the marketplace.

3.5.9-12.U - Evaluate and define the purpose of a design.

3.5.9-12.V - Apply principles of human-centered design.

3.5.9-12.W - Optimize a design by addressing desired qualities within criteria and constraints while considering trade-offs.

3.5.9-12.X - Implement the best possible solution to a design using an explicit process.

3.5.9-12.Q - Implement and critique principles, elements, and factors of design.

Essential content/objectives: At the end of the unit, students will be able to:

- Develop a detailed product specification sheet.
- Identify the target market specific to a selected product.
- Generate a product breakdown structure with bulk material pricing.
- Create a manufacturing plan based on a thorough product evaluation.
- Produce a product prototype to identified specifications.
- Create a unique value proposition for a proposed product.

Core Activities: Students will complete/participate in the following:

- Product Concept project
 - Research and notetaking
 - Problem solving & analytical thinking
 - Outreach to local businesses / Vendors
 - Hands on prototyping
 - Target market Google Forms product survey
 - Collaborative google slides presentation
 - Collaborative class discussion & Voting
 - Selection of a final product

Extensions:

- Current events
- Independent study
- Advanced hands-on application

Remediation:

- Review
- Unit Terms and Questions

- Homework
- One-on-one re-teaching
- Supplemental reading
- Problem-solving

Instructional Methods:

- Direct instruction
- Demonstrations
- Labs
- Lecture
- Observation
- Peer-to-peer collaboration
- Group problem-solving

Materials & Resources:

- Google classroom assignments
 - Worksheets
 - Project templates
- Supplemental books
- Internet resources
- Video / Projector
- Classroom tools, machines, and Materials

Assessments:

- Class discussion (Question & Answer)
- Homework/classwork assignments
- Product concept project rubric

Curriculum Scope & Sequence

Planned Course: Product Design and Manufacturing

Unit: Establishing a Manufacturing Startup

Time frame: 4 - 6 weeks

STEELS Standards:

3.5.9-12.J - Synthesize data and analyze trends to make decisions about technological products, systems, or processes.

3.5.9-12.Z - Recognize and explain how their community and the world around them informs technological development and engineering design.

3.5.9-12.GG - Evaluate how technology and engineering have been powerful forces in reshaping the social, cultural, political, and economic landscapes throughout history.

3.5.9-12.II - Investigate the widespread changes that have resulted from the Information Age, which has placed emphasis on the processing and exchange of information.

Essential content/objectives: At the end of the unit, students will be able to:

- Identify manufacturing jobs and careers in management.
- Understand the requirements and responsibilities of chosen manufacturing jobs.
- Write an effective resume specific to positions of interest.
- Understand key components to a manufacturing business plan.
- Explain 3 ways companies can raise operating capital.
- Describe how stocks work and different types of stock.
- Apply knowledge to begin a company.

Core Activities: Students will complete/participate in the following:

- Manufacturing positions worksheet
 - Lecture, class discussion, & note-taking
- Interview Project
 - Research jobs and create a list of responsibilities
 - Independent resume writing & interview agenda
 - Student led collaborative interviews & Evaluations
- Business Plan Project
 - Position specific written plans
 - Midterm Presentations
- Startup capital assignment
 - distribution on business information / investor meeting
 - Share distribution

Extensions:

- Current events
- Independent study
- Advanced hands-on application
- Creation of your own business plan

Remediation:

- Review
- Unit Terms and Questions
- Homework
- One-on-one re-teaching
- Supplemental reading
- Problem-solving

Instructional Methods:

- Direct instruction
- Demonstrations
- Labs
- Lecture
- Observation
- Peer-to-peer collaboration
- Group problem-solving

Materials & Resources:

- Google classroom assignments
 - Worksheets
 - Project templates
- Supplemental books
- Internet resources
- Video / Projector
- Classroom tools, machines, and Materials

Assessments:

- Class discussion (Question & Answer)
- Homework/classwork assignments
- Midterm business plan rubric

Curriculum Scope & Sequence

Planned Course: Product Design and Manufacturing

Unit: Preparing for Production

Time frame: 2 - 3 weeks

STEELS Standards:

3.5.9-12.N - Analyze and use relevant and appropriate design thinking processes to solve technological and engineering problems.

3.5.9-12.O - Apply appropriate design thinking processes to diagnose, adjust, and repair systems to ensure precise, safe, and proper functionality.

3.5.9-12.W - Optimize a design by addressing desired qualities within criteria and constraints while considering trade-offs.

3.5.9-12PP - Demonstrate the use of conceptual, graphical, virtual, mathematical, and physical modeling to identify conflicting considerations before the entire system is developed and to aid in design decision making.

3.5.9-12. D - Critique whether existing or proposed technologies use resources sustainably.

Essential content/objectives: At the end of the unit, students will be able to:

- Use design & modeling software to adjust the current product design to optimize quality and production.
- Acquire raw materials from vendors for processing.
- Identify the steps to tooling a manufacturing facility for a product.
- Apply ergonomics to the shop to create the best working environment possible.
- Create a product flow chart and conduct a time motion study.
- Identify the rate of product production.
- Understand the purpose of jigs and fixtures in manufacturing.
- Create materials needed for general business operations.

Core Activities: Students will complete/participate in the following:

- Job specific work
 - CNC setup
 - Tooling (Jigs & Fixtures)
 - Raw material processing
 - Business marketing
 - Product advertisements/flyers
 - Sales order forms
 - Customer service templates
 - Packaging Design

Extensions:

- Current events
- Independent study
- Advanced hands-on application
- Practice machine & tool maintenance

Remediation:

- Review
- Unit Terms and Questions
- Homework
- One-on-one re-teaching
- Supplemental reading
- Problem-solving

Instructional Methods:

- Direct instruction
- Demonstrations
- Labs
- Lecture
- Observation
- Peer-to-peer collaboration
- Group problem-solving

Materials & Resources:

- Google classroom assignments
 - Worksheets
 - Project templates
- Supplemental books
- Internet resources
- Video / Projector
- Classroom tools, machines, and Materials

Assessments:

- Weekly progress portfolio write up
- Class discussion (Question & Answer)

Curriculum Scope & Sequence

Planned Course: Product Design and Manufacturing

Unit: Daily Business Operations

Time frame: 14 - 18 weeks

STEELS Standards:

3.5.9-12.LL - Analyze the stability of a technological system and how it is influenced by all of the components in the system, especially those in the feedback loop.

3.5.9-12.MM - Troubleshoot and improve a flawed system embedded within a larger technological, social, or environmental system.

3.5.9-12.QQ - Implement quality control as a planned process to ensure that a product, service, or system meets established criteria.

3.5.9-12.OO - Use project management tools, strategies, and processes in planning, organizing, and controlling work.

3.5.9-12. D - Critique whether existing or proposed technologies use resources sustainably.

Essential content/objectives: At the end of the unit, students will be able to:

- Create quality control standards and inspections to ensure product reliability.
- Evaluate manufacturing productivity and develop methods for improvement.
- Understanding of the ins and outs of running a for profit business from start-up to dissolution.
- Fulfill job related duties for general business operations.
- Complete self and peer employee evaluations to improve business success.
- Successfully dissolve a manufacturing business.

Core Activities: Students will complete/participate in the following:

- Daily Business operations / Job specific work
 - Product production
 - Product Sales
 - Order processing
 - Website and social media
 - Financial deposits, withdrawal, & reports
 - Shareholder reports
 - Market and advertising media
 - Packaging & delivery
 - Customer service communication
 - Employee evaluations
 - Manufacturing productivity
 - Product quality control
- Business Dissolution
 - Approval
 - Final withdrawal and deposit processing

- Final product deliveries
- Distribution of assets
- Final profit figures & distribution of paychecks and share payments

Extensions:

- Current events
- Independent study
- Advanced hands-on application
- Creation of a possible union
- Analyze and solve any unforeseen circumstances
- Read the story about Post-it Notes and write a summary of the marketing strategy

Remediation:

- Review
- Unit Terms and Questions
- Homework
- One-on-one re-teaching
- Supplemental reading
- Problem-solving

Instructional Methods:

- Support and advise students on big decisions
- Direct instruction
- Demonstrations
- Labs
- Lecture
- Observation
- Peer-to-peer collaboration
- Group problem-solving

Materials & Resources:

- Google classroom assignments
 - Worksheets
 - Project templates
- Laptop
- Supplemental books
- Internet resources
- Video / Projector
- Classroom tools, machines, and Materials
- CADD Program
- 3D Printer
- CNC Machines

Assessments:

- Outcome of business profits and losses
- Project Rubric (Final Exam Portfolio)
- Weekly progress portfolio write up
- Class discussion (Question & Answer)