Washington Township Public Schools
COURSE OF STUDY – CURRICULUM GUIDE

Course: #912 Advanced Materials Processing and Production Systems

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Under the Direction of: Steve Whalen

Description:

Advanced Materials Processing and Production Systems is a five (5) credit course designed for students in grades 10-12, who have successfully completed Materials Processing and Production Systems. This course reinforces all of the skills learned in Materials Processing with special attention being paid to safety. The student will learn more advanced woodworking techniques and evaluate their own laboratory experiences. Students enrolled in this class will experience firsthand, the many differences between mass production and custom manufacturing. Students will expand upon the basic skills they have acquired in introduction materials course. They will select, design and construct a piece of furniture. A computer aided drafting system will be used to do final plans. Safe use of hand and power tools will be stressed. The students will be able to experience using a wide variety of hand tolls, portable power tools, and the various machines that are available to them in the lab. Discussions will take place that deal with the many different levels of product quality that is on today's market. Various careers dealing with the manufacturing field are also discussed. Safety is stressed as an on-going item on a daily basis.

Jack McGee: *Interim Assistant Superintendent for Curriculum & Instruction*
Gretchen Gerber: *Director of Elementary Education*
Cleve Bryan: *Interim Director of Secondary Education*

Written: August, 2015
Revised:
BOE Approval: SEPTEMBER, 2015

DEMONSTRABLE PROFICIENCIES

COURSE NAME: Advanced Materials Processing And Production Systems

I. CLASSWORK REQUIREMENTS

A. Keep an organized folder, complete with written notes, handouts, worksheets, assignments and examples of class work.
B. In order to use any machine all safety quizzes must be completed with a 100% or a retake will be given.
C. Students must be attentive and effectively following directions.
D. Students must exhibit responsibility by bringing a pencil to class every day.
E. Student resource materials should be legible, well organized, and attention to detail must be noted.
F. Short-term problem applications will be assigned when appropriate.
G. Follow all safety and clean-up rules.
H. Students will take periodic tests and quizzes including a midterm and final exam.
I. When needed students will be required to bring in supplemental funds for hardware, clock parts, etc.

II. ATTITUDE & BEHAVIOR

The student will demonstrate proper behavior as outlined in the school handbook. In addition to the general rules, special attention must be paid to safety in the classroom, following directions, listening skills, respect for others and their property, responsibility and proper work habits. Since there is a large amount of expensive and dangerous machinery in the classroom, appropriate student conduct is necessary to provide a quality and safe work environment. Students are expected to use tools, machines and computers for their intended use.

III. COURSE OBJECTIVES/OVERVIEW

A. **COURSE CONTENT**
1. Information
   a. Basic knowledge of technological systems.
   b. Knowledge and safe use of all tools, equipment and machines.
   c. Construction applications through the creation of various projects.

B. SKILLS-

1. Safety
2. Project Planning
3. Measurement
4. Use of Hand Tools
5. Use of Power Tools
6. Project Construction and Assembly
7. Project Finishing
8. Manufacturing
9. Career Exploration
10. CNC Project

C. APPRECIATION OF CONCEPTS

a. An Increased appreciation for organization and orderliness of one's materials to enhance the expediency of performing a task.
b. An ability to analyze and reproduce select information.
c. The ability to adjust quickly to equipment, program, and procedure changes.
d. Increased awareness of the amount of planning and design that goes into the development, construction of any project.
e. The importance of selecting a career that is associated to personal interest.

MAJOR UNITS OF STUDY

Course Title: Advanced Materials Processing and Production Systems

I. Introduction to Course/Lab Safety and Room Procedures
II. Careers
III. Designing, Planning and Measurement
IV. Hand Tools-Review
V. Power Tools-Review
VI. Introduction to Furniture and Cabinet Making
VII. Design Project
VIII. Manufacturing and Mass Production

UNIT OVERVIEW

Course Title: Advanced Materials Production and Processing Systems

Unit #: **UNIT 1 OVERVIEW** **Unit Title:** Introduction to Course/Lab Safety and Room Procedures

Unit Description and Objectives:
Students are given a tour of the facilities with an emphasis safety. They are introduced to the resources at hand for the process of design and woodworking. An overview of the course is presented with emphasis on learning activities and types of issues that will be explored. Students are also told what to do and where to go in the event of an emergency. Basic classroom expectations regarding behavior and work ethic are discussed.

Essential Questions and Enduring Understandings:

Essential Questions:	**Enduring Understandings/Generalizations** **Students will understand that:**	**Guiding Questions**
1. What is the purpose of a facilities safety and health program?	1. The importance of following proper safety protocol	1.1 How should you dress when operating machinery in a shop? 1.2 What is the purpose of a "power cut-off switch?"
2. What is the purpose of facilities evacuation and lockdown protocol?	2. The district has a safety and evacuation program in place to keep them safe in a variety of different life threatening situations	2.1 Where does our class go during a lockdown? 2.2 What is the evacuation route for a fire drill?

CURRICULUM UNIT PLAN

Course Title/Grade: Advanced Materials Processing and Production Systems/ 10-12
Unit Number/Title: **Unit I- Introduction to Course/Lab Safety and Room Procedures**
Conceptual Lens:
Appropriate Time Allocation (# of Days)**:** 1 Week

Primary Content Standards referenced With Cumulative Progress Indicators			
9.3.12.AR 4	9.3.ST-ET.4		
9.3.12.AR.B4			
9.3.IT-SUP.2-3			

Topics/Concepts (Incl. time / # days per topic)	**Critical Content (Students Will Know:)**	**Skill Objectives (Students Will Be Able To:)**	**Instructional/Learning Activities & Interdisciplinary Connections**	**Instructional Resources**	**Technology & 21st C Skills Integration (Specify)**	**NJSLS w/ CPI Reference**	**Evaluation/ Assessment:**
A. Classroom expectations 1. Behavior 2. Grading procedure 3. Attendance 4. Lateness 5. Housekeeping **B.** Egress/Evacuation 1. Fire Drill 2. Evacuation 3. Lock-down 4. Intruder **C.** Tools of the Lab 1. Work Benches/Vises 2. Measuring Tools 3. Hand Tools 4. Power Tools 5. Cabinets and Storage **D.** Lab Layout **E.** Introduction to Course	1. What the consequences of unexcused lateness are. 2. What the procedures are for making up work after being absent. 3. Where to go during a fire drill. 4. Where to go and what to do during any of the other emergencies. 5. Where the tools and storage cabinets are located. 6. The general layout of the lab as it relates to their assigned seat. 7. The procedures for maintaining a clean lab. 8. How activities are evaluated.	1. Explain what will happen on their third unexcused lateness of less than two minutes; of between 2 and 5 minutes; more than 5 minutes. 2. Locate the designated area(s) for all emergencies. 3. Locate tools and storage cabinets within the design lab. 4. Sit in their assigned seats. 5. Maintain their individual work area as well as the lab with regard to proper clean-up after each period as required. 6. State the various categories used in the grade breakdown.	1. Students go outside to observe the location of their designated area for a fire drill. 2. Students and teacher discuss the different emergencies and what to do and where to go under various circumstances. 3. Teacher demonstrates location of all storage areas and tool cabinets. 4. Teacher demonstrates clean-up procedures. 5. Teacher discusses grading and evaluative processes. 6. Teacher/student discussion of current and/or past issues and problems in the areas of woodworking and construction.	Student Handbook Textbook Students will be given a copy of -Course Proficiencies -General Safety Rules -Rules and Regulations of class(to be signed by student and parent)	9.3.12.AR 4 9.3.12.AR.B4 9.3.IT-SUP.2-3 9.3.ST-ET.4	8.2.a.1-3 8.2.b.1-6 8.2.c.1-3	**Formative Assessment:** 1. Safety Quiz **Summative Assessment** -Benchmark TEST -Midterm Exam -Final EXAM

Unit Modifications for Special Population Students:

Struggling Learners	Gifted and Talented Students (Challenge Activities)	English Language Learners	Learners with an IEP	Learners with a 504
• Assist students in getting organized. • Give short directions. • Use drill exercises. • Give prompt cues during student performance. • Let students with poor writing skills use a computer. • Break assignments into small segments and assign only one segment at a time. • Demonstrate skills and have students model them. • Give prompt feedback. • Use continuous assessment to mark students' daily progress. • Prepare materials at varying levels of ability.	• Provide ample opportunities for creative behavior. • Create assignments that call for original work, independent learning, critical thinking, problem solving, and experimentation. • Show appreciation for creative efforts • Respect unusual questions, ideas, and solutions. • Encourage students to test their ideas. • Provide opportunities and give credit for self-initiated learning. • Avoid overly detailed supervision and too much reliance on prescribed curricula. • Allow time for reflection. • Resist immediate and constant evaluation. • Avoid comparisons to other students.	• Use a slow, but natural rate of speech; speak clearly; use shorter sentences; repeat concepts in several ways. • When possible, use pictures, photos, and charts. • Corrections should be limited and appropriate. Do not correct grammar or usage errors in front of the class. • Give honest praise and positive feedback through your voice tones and visual articulation whenever possible. • Encourage students to use language to communicate, allowing them to use their native language to ask/answer questions when they are unable to do so in English. • Integrate students' cultural background into class discussions. • Use cooperative learning where students have opportunities to practice expressing ideas without risking language errors in front of the entire class.	Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all	• Refer to page four in the Parent and Educator Guide to Section 504 to assist in the development of appropriate plans.

			learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org	

UNIT OVERVIEW

Course Title: Advanced Materials Production and Processing Systems

Unit #: UNIT 2 **Unit Title:** Careers

Unit Description and Objectives:

Career opportunities in the woodworking and manufacturing field are widespread. They range from entry-level positions to professional opportunities, as well as entrepreneurial possibilities. Students will compose a resume for an entry level position in the woodworking/construction field. The students will then critique each other's resume from the point of view of a company seeking to hire new employees. They will offer recommendations on how they can make themselves more employable.

Essential Questions and Enduring Understandings:

Essential Questions:	Enduring Understandings/Generalizations Students will understand that:	Guiding Questions
1. What factors influence career decisions?	1. The past, present, and future technological advances as they relate to a chosen career pathway.	1.1 What are several career choices for a person interested in the woodworking and manufacturing industry? 1.2 Name a few career choices in the construction industry

2. What personal qualities are essential for professional careers?	2. It is important to make effective decisions, use career information, and manage personal career plans.	2.1 What are some resources for career investigation? 2.2 Name a few local trade schools

Course Title/Grade: Advanced Materials Processing and Production Systems/ 10-12
Unit Number/Title: Unit 2-Careers
Conceptual Lens:
Appropriate Time Allocation (# of Days): 1 week

Primary Content Standards referenced With Cumulative Progress Indicators
9.1.Gr12.A1-5
9.1.Gr12.B15
9.2.Gr12.D1-5

Topics/Concepts (Incl. time / # days per topic)	Critical Content (Students Will Know :)	Skill Objectives (Students Will Be Able To :)	Instructional/Learning Activities & Interdisciplinary Connections	Instructional Resources	Technology & 21st C Skills Integration (Specify)	NJSLS w/ CPI Reference	Evaluation/ Assessment:
A. Identifyingy a career choice 1. Occupational Outlook Handbook 2. School experience 3. Public library 4. Clubs or summer job 5. Vocational tests 6. Employment forms 7. Develop job contacts B. Choosing a career 1. Do I have the ability? 2. Do I have the interest? C. Types of careers 1. Construction trades a. Framers b. Finishers c. Electricians d. Plumbers e. HVAC	1. The assistance the Occupational Outlook Handbook can give in pursuing employment. 2. The explanation of "entry-level" employment. 3. The benefits of work for and with a union. 4. The explanation of an apprenticeship program and how it prepares one for the job. 5. The requirements needed to attain management positions.	1. Explain the various levels of employment. 2. Explain the variations in "union" and "non-union" job market. 3. Understand how to use the Occupational Outlook Handbook to assist them in obtaining employment. 4. Understand how an apprenticeship program benefits or hinders their chances for employment. 5. Explain the principle of "upper" management in business. 6. Discuss the give and take between salary and benefits and the effect on a paycheck.	1. Lecture and class discussion 2 Guest speaker 3. In class exercises 4. Various video clips of professionals 5. Assigned homework- students will do a current event on one type of woodworking career of their choice.	1. Lecture and class discussion 2. Various video clips of lumber mill creating sheet goods, veneers, and lumber from logs 3. In class exercises 4. Practical labs	9.1.Gr12.A1-5 9.1.Gr12.B15 9.2.Gr12.D1-5	8.1.Gr8.A1-12 8.1.Gr8.B1-10	**Formative Assessments:** 1. Class Participation 2. Class work 3. Worksheet 4. Quizzes 5. Current event **Summative Assessment(s)**

Topics/Concepts (Incl. time / # days per topic)	Critical Content (Students Will Know :)	Skill Objectives (Students Will Be Able To :)	Instructional/Learning Activities & Interdisciplinary Connections	Instructional Resources	Technology & 21st C Skills Integration (Specify)	NJSLS w/ CPI Reference	Evaluation/ Assessment:
f. Other 2. Manufacturing trades a.Cabinet makers b. Machinists c.Plastic injection molders 3. Engineering a. Industrial b. Mechanical c. Electrical d. Marine e. Civil 4. Environmental a. Forestry b.EPA D. Career levels 1. Craftspeople 2. Technicians 3. Professionals.	6. The advantages of benefits and salary.						

Unit Modifications for Special Population Students:

Struggling Learners	Gifted and Talented Students (Challenge Activities)	English Language Learners	Learners with an IEP	Learners with a 504
• Assist students in getting organized. • Give short directions. • Use drill exercises. • Give prompt cues during student performance. • Let students with poor writing skills use a computer. • Break assignments into small segments and assign only one segment at a time. • Demonstrate skills and have students model them. • Give prompt feedback. • Use continuous assessment to mark students' daily progress. • Prepare materials at varying levels of ability.	• Provide ample opportunities for creative behavior. • Create assignments that call for original work, independent learning, critical thinking, problem solving, and experimentation. • Show appreciation for creative efforts • Respect unusual questions, ideas, and solutions. • Encourage students to test their ideas. • Provide opportunities and give credit for self-initiated learning. • Avoid overly detailed supervision and too much reliance on prescribed curricula. • Allow time for reflection. • Resist immediate and constant evaluation. • Avoid comparisons to other students.	• Use a slow, but natural rate of speech; speak clearly; use shorter sentences; repeat concepts in several ways. • When possible, use pictures, photos, and charts. • Corrections should be limited and appropriate. Do not correct grammar or usage errors in front of the class. • Give honest praise and positive feedback through your voice tones and visual articulation whenever possible. • Encourage students to use language to communicate, allowing them to use their native language to ask/answer questions when they are unable to do so in English. • Integrate students' cultural background into class discussions. • Use cooperative learning where students have opportunities to practice expressing ideas without risking language errors in front of the entire class.	Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a	• Refer to page four in the Parent and Educator Guide to Section 504 to assist in the development of appropriate plans.

			set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org	

UNIT OVERVIEW

Course Title: **Advanced Materials Processing and Production Systems**

Unit #: Unit 3 **Unit Title:** Designing, Planning and Measurement

Unit Description and Objectives:
Explanation and demonstration of various types of design practices will take place. Students will formulate a bill of materials for a given project and create a plan of procedure. Students will make a cost analysis to come up with a final cost. Autodesk inventor will also be introduced and used as a design tool.

Essential Questions and Enduring Understandings:

Essential Questions:	**Enduring Understandings/Generalizations Students will understand that:**	**Guiding Questions**
1. Why is it important to design and plan out you work	1. Planning is an essential component to design, construction, materials usage, and efficiency	1.1 What is the first step in making a design 1.2 How can a proper design plan save you money in materials
2. What is the difference between a metric and	2 The ability to read and understand a ruler is	2.1 How to convert fractional inches to decimal

standard ruler	extremely important.	inches. 2.2 How to reach a standard ruler

CURRICULUM UNIT PLAN

Course Title/Grade: Advanced Materials Processing and Production Systems/ 10-12
Unit Number/Title: Unit 3-Designing, Planning and Measurement
Conceptual Lens:
Appropriate Time Allocation (# of Days): 2 weeks

Primary Content Standards referenced With Cumulative Progress Indicators			
9.1.12.A.1-4	9.4.12.D(1).2-4	9.4.12.E.26	
9.1.12.B.1-3	9.4.12.E.2	9.4.12.E.30	
9.1.12.C.1	9.4.12.E.15	9.4.12.E.32	

Topics/Concepts (Incl. time / # days per topic)	Critical Content (Students Will Know:)	Skill Objectives (Students Will Be Able To:)	Instructional/Learning Activities & Interdisciplinary Connections	Instructional Resources	Technology & 21st C Skills Integration (Specify)	NJSLS w/ CPI Reference	Evaluation/ Assessment:
A. Planning your project 1. Obtain working drawing a. Views b. Scale c. Lines 2. Lumber needs a. Board feet b. Square feet c. Lineal feet 3. Bill of materials 4. Cutting list 5. Plan of Procedure B. Measuring and layout tools 1. Rules a. Tape measure b. Folding rules c. Bench rule 2. Reading a customary ruler 3. Reading a metric ruler 4. Squares a. Framing square b. Try square c. Combination square	1. The definition of a working drawing 2. How to read a ruler to the nearest 16th of an inch. 3. Describe the concept of scale 4. Identify the basic as well as more advanced measuring and layout tools 5. How to use a square 6. The basic steps in planning a project 7. The difference between a board, square , and lineal foot	1. Demonstrate the proper use of measuring and layout tools 2. Read and use working drawings 3. Name and describe 5 types of lines commonly used on working drawings 4. Calculate board feet, square feet, and lineal feet 5. Prepare a bill of materials 6. Make a stock cutting list 7. Prepare a plan of procedure for constructing a project 8. Measure to the nearest 1/16” 9. Measure to the nearest mm	1. Lecture and class discussion 2. Measure several pieces of wood and calculate the board feet of each piece. 3. In class exercises 4. Practical labs 5. Assigned homework- students must measure different item in their house. 6. Students will have to make a three view drawing of a given object	-Textbook -Projector -Computer -Handouts -Examples of various types of drawings -Example of one board foot of material -Orthographic paper -Ruler, square, tape measure	9.1.12.A.1-4 9.1.12.B.1-3 9.1.12.C.1 9.4.12.D(1).2-4 9.4.12.E.2 9.4.12.E.15 9.4.12.E.26 9.4.12.E.30 9.4.12.E.32	8.2.12.C.1, 8.2.12.C.2, 8.2.12.C.3 8.2.12.C.4 8.2.12.C.5 8.2.12.C.6 8.2.12.C.7 8.2.12.C.8	**Formative Assessment:** 1. Reading a ruler 2. Using a ruler to measure a given object 3. Drawing exercises 4. Math worksheets a. alculating board, square, and lineal feet. b. atio and scale **Summative Assessment** -Benchmark TEST -Midterm EXAM -Final Exam

Topics/Concepts (Incl. time / # days per topic)	**Critical Content** (Students Will Know:)	**Skill Objectives** (Students Will Be Able To:)	**Instructional/Learning Activities & Interdisciplinary Connections**	**Instructional Resources**	**Technology & 21st C Skills Integration (Specify)**	**NJSLS w/ CPI Reference**	**Evaluation/ Assessment:**
	8. The difference between scale and ratio 9. Introduction to Autodesk Inventor						

Unit Modifications for Special Population Students:

Struggling Learners	Gifted and Talented Students (Challenge Activities)	English Language Learners	Learners with an IEP	Learners with a 504
• Assist students in getting organized. • Give short directions. • Use drill exercises. • Give prompt cues during student performance. • Let students with poor writing skills use a computer. • Break assignments into small segments and assign only one segment at a time. • Demonstrate skills and have students model them. • Give prompt feedback. • Use continuous assessment to mark students' daily progress. • Prepare materials at varying levels of ability.	• Provide ample opportunities for creative behavior. • Create assignments that call for original work, independent learning, critical thinking, problem solving, and experimentation. • Show appreciation for creative efforts • Respect unusual questions, ideas, and solutions. • Encourage students to test their ideas. • Provide opportunities and give credit for self-initiated learning. • Avoid overly detailed supervision and too much reliance on prescribed curricula. • Allow time for reflection. • Resist immediate and constant evaluation. • Avoid comparisons to other students.	• Use a slow, but natural rate of speech; speak clearly; use shorter sentences; repeat concepts in several ways. • When possible, use pictures, photos, and charts. • Corrections should be limited and appropriate. Do not correct grammar or usage errors in front of the class. • Give honest praise and positive feedback through your voice tones and visual articulation whenever possible. • Encourage students to use language to communicate, allowing them to use their native language to ask/answer questions when they are unable to do so in English. • Integrate students' cultural background into class discussions. • Use cooperative learning where students have opportunities to practice expressing ideas without risking language errors in front of the entire class.	Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a	• Refer to page four in the Parent and Educator Guide to Section 504 to assist in the development of appropriate plans.

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UNIT OVERVIEW

Course Title: Advanced Materials Production and Processing Systems

Unit #: **UNIT 4 OVERVIEW** **Unit Title:** Hand Tools and Techniques

Unit Description and Objectives:
All of the various hand tools used for successful completion of the course will be described and demonstrated. Students will point out the differences between each type of hand tool. They will also be introduced to more advanced types of tools and their uses. Safe and correct use of hand tools will be reviewed and practiced on a daily basis through project work.

Essential Questions and Enduring Understandings:

Essential Questions:	**Enduring Understandings/Generalizations Students will understand that:**	**Guiding Questions**
1. How do you determine which tools are most appropriate for a particular task?	1. Tools have specific functions and methods for usage	1. 1What are some of the hand tools commonly used in processing and production? 1.2 How do you decide what tool to use for a particular project?
2. How should the various hand tools be handled so that they	2. There are specific techniques for using each hand tool	2.1 How do you safely use a back saw? 2.2 How do you safely carry a tool throughout the classroom?

are used safely and effectively?	correctly and safely.	

CURRICULUM UNIT PLAN

Course Title/Grade: Advanced Materials Processing and Production Systems/ 10-12
Unit Number/Title: Unit 4-Hand Tools and Techniques
Conceptual Lens:
Appropriate Time Allocation (# of Days): 1 week

Primary Content Standards referenced With Cumulative Progress Indicators			
9.1.12.F.1	9.3.12.E.15	9.3.12.E.32	
9.3.12.D(1).2-4	9.3.12.E.26		
9.3.12.E.2	9.3.12.E.30		

Topics/Concepts (Incl. time / # days per topic)	Critical Content (Students Will Know:)	Skill Objectives (Students Will Be Able To:)	Instructional/Learning Activities & Interdisciplinary Connections	Instructional Resources	Technology & 21st C Skills Integration (Specify)	NJSLS w/ CPI Reference	Evaluation/ Assessment:
Students will deepen their understanding in the following areas. A. Hand Saws 1. Crosscut saw 2. Rip saw 3. Back saw 4. Coping saw 5. Hack saw B. Shaping tools 1. Planes a. Jack plane b. Block plane c. Router plane d. Rabbet plane 2. Files a. Half-round b. Square c. Round 3. Chisels C. Assembling tools 1. Hammers a. Claw hammer b. Ripping hammer c. Framing hammer 2. Nail sets 3. Screw drivers 4. Nail guns	1. How to identify the different hand tools that are used for cutting 2. The difference between each type of hand tool and their uses. 3. How to compare and contrast various types of planes 4. How to differentiate between the various types of files. 5. How to differentiate between the various types hammers used to carpentry and woodworking.	*Students will deepen their understanding in the following areas.* 1. Properly usage of each hand tool. 2. Correctly carry each tool throughout the classroom. 3. Properly sharpen the chisel to a 30 degree angle. 4. Insert a screw using a screw driver. 5. Make a rabbet and dado joint with a chisel. 6. Remove a nail using a claw hammer. 7. Point out the differences between each	1. Lecture and class discussions. 2. Demonstrations on how to properly use each tool. 3. Practical labs 4. Students will make a rabbet, miter, and dado joint using hand tools. 5. Selecting appropriate tool for the task at hand. 6. Reading assignments on hand tool usage and safety	-Textbook -Projector -Computer -Handouts -Examples of each type of hand tool -Examples of projects made by hand tools	9.1.12.F.1 9.3.12.D(1).2-4 9.3.12.E.2 9.3.12.E.15 9.3.12.E.26 9.3.12.E.30 9.3.12.E.32	8.2.12.D.1 8.2.12.D.3 8.2.12.D.5	**Formative Assessment:** 1. Safety quiz on hand tool usage. 2. Performance test on hand tool selection and proper usage. 3. Identification Quiz **Summative Assessment** -Benchmark TEST -Midterm EXAM -Final Exam

Topics/Concepts (Incl. time / # days per topic)	**Critical Content (Students Will Know:)**	**Skill Objectives (Students Will Be Able To:)**	**Instructional/Learning Activities & Interdisciplinary Connections**	**Instructional Resources**	**Technology & 21st C Skills Integration (Specify)**	**NJSLS w/ CPI Reference**	**Evaluation/ Assessment:**
a. Brad nail gun b. Finish nail gun		layout tool and give a brief description of their uses.					

Unit Modifications for Special Population Students:

Struggling Learners	Gifted and Talented Students (Challenge Activities)	English Language Learners	Learners with an IEP	Learners with a 504
• Assist students in getting organized. • Give short directions. • Use drill exercises. • Give prompt cues during student performance. • Let students with poor writing skills use a computer. • Break assignments into small segments and assign only one segment at a time. • Demonstrate skills and have students model them. • Give prompt feedback. • Use continuous assessment to mark students' daily progress. • Prepare materials at varying levels of ability.	• Provide ample opportunities for creative behavior. • Create assignments that call for original work, independent learning, critical thinking, problem solving, and experimentation. • Show appreciation for creative efforts • Respect unusual questions, ideas, and solutions. • Encourage students to test their ideas. • Provide opportunities and give credit for self-initiated learning. • Avoid overly detailed supervision and too much reliance on prescribed curricula. • Allow time for reflection. • Resist immediate and constant evaluation. • Avoid comparisons to other students.	• Use a slow, but natural rate of speech; speak clearly; use shorter sentences; repeat concepts in several ways. • When possible, use pictures, photos, and charts. • Corrections should be limited and appropriate. Do not correct grammar or usage errors in front of the class. • Give honest praise and positive feedback through your voice tones and visual articulation whenever possible. • Encourage students to use language to communicate, allowing them to use their native language to ask/answer questions when they are unable to do so in English. • Integrate students' cultural background into class discussions. • Use cooperative learning where students have opportunities to practice expressing ideas without risking language errors in front of the entire class.	Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org	• Refer to page four in the Parent and Educator Guide to Section 504 to assist in the development of appropriate plans.

UNIT OVERVIEW

Course Title: Advanced Materials Production and Processing Systems

Unit #: **UNIT 5 OVERVIEW** **Unit Title:** Power Tools and Machine Processes

Unit Description and Objectives:
Describe and demonstrate safe machine uses. Discuss the correct and incorrect methods of operating each machine as it is demonstrated. Basic as well as more advanced applications of each machine will be included in the demonstrations. Students will be introduced to rapid prototyping machines such as the CNC router and 3D printer.

Essential Questions and Enduring Understandings:

Essential Questions:	**Enduring Understandings/Generalizations** **Students will understand that:**	**Guiding Questions**
1. What are the safety hazards when working with stationary power tools?	1. There are safety hazards when using stationary power tools.	1.1 What safety procedures are most relevant when working with stationary power tools?
2. What benefits do stationary power tools have over basic hand tools or portable power tools	2. It is essential to use each stationary power tool correctly in order to ensure effectiveness and safety.	2.1 What should you do when drilling a hole in round stock on a drill press?
3. What are the most commonly used stationary power tools?	3. Each stationary power tool is designed for a specific function.	3.1 What types of cuts can be performed on a table saw?

CURRICULUM UNIT PLAN

Course Title/Grade: Advanced Materials Processing and Production Systems/ 10-12
Unit Number/Title: Unit 5-Power Tools and Machine Processes
Conceptual Lens:
Appropriate Time Allocation (# of Days): 3 weeks

Primary Content Standards referenced With Cumulative Progress Indicators			
9.1.12.F.1	9.3.12.E.15	9.3.12.E.32	
9.3.12.D(1).2-4	9.3.12.E.26		
9.3.12.E.2	9.3.12.E.30		

Topics/Concepts (Incl. time / # days per topic)	Critical Content (Students Will Know :)	Skill Objectives (Students Will Be Able To :)	Instructional/Learning Activities & Interdisciplinary Connections	Instructional Resources	Technology & 21st C Skills Integration (Specify)	NJSLS w/ CPI Reference	Evaluation/ Assessment:
Students will deepen their understanding in the following areas. A. Table Saw 1. Safety a. Before turning on the power b. While cutting c. Finishing the job 2. Table saw blades a. Changing the blade b. Types of blades 3. Types of cuts a. Crosscutting b. Ripping c. Beveling d. Mitering e. Cutting a rabbet and dado B. Band saw 1. Safety a. Before turning on the power b. While cutting c. Finishing the job	1. How to be able to distinguish between proper and improper uses of each machine 2. How to compose a set of directions for machine set-ups and simple adjustments necessary to utilize these machines with different types of materials 3. How to choose the best blade for	*Students will deepen their understanding in the following areas.* 1. Identify each machine in the lab and explain what processes can be performed on them. 2. Exhibit a positive attitude toward the safe use of each machine and its' capabilities. 3. Demonstrate their ability to manipulate these machines to accomplish tasks that would otherwise take greater time if hand tools were used.	1. Lecture and class discussion 2. Definitions will be given for new terms and the students will begin to develop a vocabulary. 3. Questions and answers 4. Reading assignments from the text. 5. Demonstration of each power tool with an emphasis on safety 6. The demonstration may include such materials as wood, plastic, metal, paper, and other materials available in the shop.	-Textbook -Projector -Computer -Handouts -Examples of each type of machine -Examples of router bits -Examples of different types drum sand paper and belt sanders -Examples of blades and parting tools -Sample projects made using these machine	9.1.12.F.1 9.3.12.D(1).2-4 9.3.12.E.2 9.3.12.E.15 9.3.12.E.26 9.3.12.E.30 9.3.12.E.32	8.2.12.D.1 8.2.12.D.3 8.2.12.D.5	**Formative Assessment:** 1. Safety quiz on power tool usage. -Students must pass the safely quiz with a 100% before they are permitted to use the power tools. 2. Performance test on power tool selection and proper usage. 3. Identification Quiz **Summative Assessment** -Benchmark TEST -Midterm EXAM -Final Exam

Topics/Concepts (Incl. time / # days per topic)	Critical Content (Students Will Know :)	Skill Objectives (Students Will Be Able To :)	Instructional/Learning Activities & Interdisciplinary Connections	Instructional Resources	Technology & 21st C Skills Integration (Specify)	NJSLS w/ CPI Reference	Evaluation/ Assessment:
2. Band saw blades a. Changing the blade b. Types of blades 3. Types of cuts a. Relief cuts b. Resawing c. Cutting curves C. Scroll Saw 1. Safety a. Before turning on the power b. While cutting c. Finishing the job 2. Scroll saw blades a. Changing the blade b. Types of blades 3. Types of cuts a. Internal and external cuts b. Stack cutting c. Inlay cutting D. Miter Saw 1. Safety a. Before turning on the power b. While cutting c. Finishing the job 2. Miter saw blades a. Changing the blade b. Types of blades 3. Types of cuts a. Miter cut b. Bevel cut c. Straight cut 4. Clamping accessories E. Jointer	cutting a sheet of plywood, laminate, Plexiglas…. etc. 4. The difference between a planer blade and jointer blade. 5. The 5 steps on how to square a board. 6. The steps involved on how to safely change a router bit.	4. Explain machine set-ups and simple adjustments necessary to utilize these machines with different types of materials. 5. Make adjustments necessary for safe operation of these machines. 6. Make adjustments necessary for safe operation of these machines. 7. Properly clean each machine after use and prepare each machine for later operations. 8. Identify the need for proper attitude and awareness while operating any power machine. **9.** Develop a self awareness while in the lab around machines in operation and wear safety glasses at all	7. Information sheets will be given to each student and safe techniques will be explained. 8. Students use each machine under the direction and observation of the teacher. 9. Students take a quiz on each machine.				

Topics/Concepts (Incl. time / # days per topic)	Critical Content (Students Will Know :)	Skill Objectives (Students Will Be Able To :)	Instructional/Learning Activities & Interdisciplinary Connections	Instructional Resources	Technology & 21st C Skills Integration (Specify)	NJSLS w/ CPI Reference	Evaluation/ Assessment:
1. Safety a. Before turning on the power b. While cutting c. Finishing the job 2. Types of cuts a. Edge b. End grain c. Surface d. Rabbeting 3. Adjusting the jointer a. Fence b. Infeed table c. Outfeed table F. Planer 1. Safety a. Before turning on the power b. While cutting c. Finishing the job 2. Adjusting the planer a. Table height b. Feed rate G. Drill Press 1. Safety a. Before turning on the power b. While cutting c. Finishing the job 2. Types of bits a. Twist b. Forstner c. Brad point d. Paddle 3. Types of cutting a. Large holes b. Small holes c. Deep holes 4. Types of material		times whether working on a machine or just watching someone else.					

Topics/Concepts (Incl. time / # days per topic)	Critical Content (Students Will Know :)	Skill Objectives (Students Will Be Able To :)	Instructional/Learning Activities & Interdisciplinary Connections	Instructional Resources	Technology & 21st C Skills Integration (Specify)	NJSLS w/ CPI Reference	Evaluation/ Assessment:
a. Flat stock b. Round stock c. Small stock H. Router Table 1. Safety a. Before turning on the power b. While cutting c. Finishing the job 2. Types of bits 3. Adjustments I. Belt Sander 1. Safety a. Before turning on the power b. While cutting c. Finishing the job 2. Types of abrasive paper a. Changing the belt J. Drum Sander 1. Safety a. Before turning on the power b. While cutting c. Finishing the job 2. Types of abrasive paper 3. Changing the drums K. Lathe 1. Safety a. Before turning on the power b. While cutting c. Finishing the job 2. Woodturning tools							

Topics/Concepts (Incl. time / # days per topic)	Critical Content (Students Will Know :)	Skill Objectives (Students Will Be Able To :)	Instructional/Learning Activities & Interdisciplinary Connections	Instructional Resources	Technology & 21st C Skills Integration (Specify)	NJSLS w/ CPI Reference	Evaluation/ Assessment:
a. Gouge b. Skew c. Parting tool d. Round nose, spear point, and flat nose 3. Woods for woodturning a. Gluing stock 4. Types of turning a. Spindle turning b. Headstock turning c. Duplicating 5. Sanding 6. Finishing .							

Unit Modifications for Special Population Students:

Struggling Learners	Gifted and Talented Students (Challenge Activities)	English Language Learners	Learners with an IEP	Learners with a 504
• Assist students in getting organized. • Give short directions. • Use drill exercises. • Give prompt cues during student performance. • Let students with poor writing skills use a computer. • Break assignments into small segments and assign only one segment at a time. • Demonstrate skills and have students model them. • Give prompt feedback. • Use continuous assessment to mark students' daily progress. • Prepare materials at varying levels of ability.	• Provide ample opportunities for creative behavior. • Create assignments that call for original work, independent learning, critical thinking, problem solving, and experimentation. • Show appreciation for creative efforts • Respect unusual questions, ideas, and solutions. • Encourage students to test their ideas. • Provide opportunities and give credit for self-initiated learning. • Avoid overly detailed supervision and too much reliance on prescribed curricula. • Allow time for reflection. • Resist immediate and constant evaluation. • Avoid comparisons to other students.	• Use a slow, but natural rate of speech; speak clearly; use shorter sentences; repeat concepts in several ways. • When possible, use pictures, photos, and charts. • Corrections should be limited and appropriate. Do not correct grammar or usage errors in front of the class. • Give honest praise and positive feedback through your voice tones and visual articulation whenever possible. • Encourage students to use language to communicate, allowing them to use their native language to ask/answer questions when they are unable to do so in English. • Integrate students' cultural background into class discussions. • Use cooperative learning where students have opportunities to practice expressing ideas without risking language errors in front of the entire class.	Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a	• Refer to page four in the Parent and Educator Guide to Section 504 to assist in the development of appropriate plans.

			set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org	

UNIT OVERVIEW

Course Title: Advanced Materials Production and Processing Systems

Unit #: **UNIT 6 OVERVIEW** **Unit Title:** Furniture Design and Cabinet Making

Unit Description and Objectives:

Students will be able to independently use their learning to research, design and construct a custom piece of furniture.

Essential Questions and Enduring Understandings:

Essential Questions:	**Enduring Understandings/Generalizations** **Students will understand that:**	**Guiding Questions**
1. How do the different case/carcass designs affect a woodworking project?	1. The art of cabinetmaking encompasses a vast array of woodworking skills and techniques.	1.1 Name a few woodworking skills needed to construct an end table. 1.2 How important is a good design in regards to furniture construction.
2. What role does doors and drawers play in a woodworking project?	2. The addition of drawers/doors to a project can add increased function as well as aesthetic value.	2.1 Explain the purpose of a drawer slide. 2.2 Name a few different hinge designs.

CURRICULUM UNIT PLAN

Course Title/Grade: Advanced Materials Processing and Production Systems/ 10-12
Unit Number/Title: Unit 6-Furniture Design and Cabinet Production
Conceptual Lens:
Appropriate Time Allocation (# of Days): 8 weeks

Primary Content Standards referenced With Cumulative Progress Indicators			
9.1.12.F.1	9.3.12.E.15	9.3.12.E.32	
9.3.12.D(1).2-4	9.3.12.E.26		
9.3.12.E.2	9.3.12.E.30		

Topics/Concepts (Incl. time / # days per topic)	Critical Content (Students Will Know :)	Skill Objectives (Students Will Be Able To :)	Instructional/Learning Activities & Interdisciplinary Connections	Instructional Resources	Technology & 21st C Skills Integration (Specify)	NJSLS w/ CPI Reference	Evaluation/ Assessment:
A. Overview 1. Carefully read plans 2. Materials selection B. Rough Cutting 1. Cut all pieces 1" longer than desired width 2. Label each piece in pencil or chalk C. Gluing 1. Glue-up pieces for legs and top 2. Wipe off excess glue D. Exact cutting 1. Measure and safely machine each piece to exact dimensions	1. Types of frame construction 2. Leg and rail construction. 3. Standard sizes used in furniture / cabinetmaking 4. Proper lumber selection. 5. Shelf construction. 6. Top construction. 7. Drawer construction. 8. Drawer guides. 9. The difference between swinging and sliding doors. 10. Raised paned door construction. 11. Door and drawer hardware.	1. Construct face frames and aprons. 2. Construct a variety of legs and rails. 3. Apply standard size theory in project design. 4. Select an appropriate lumber for the given project. 5. Design and construct shelves. 6. Design and construct tops. 7. Construct a variety of different drawers. 8. Select an appropriate drawer guide for the given project. 9. Select an appropriate door type for a given project.	1 Lecture and class discussion definitions will be given for new terms and the students will begin to develop a vocabulary. 2. Questions and answers Reading assignments from the text. Demonstration of each power tool with an emphasis on safety. 3. The demonstration may include such materials as wood, plastic, metal, paper, and other materials available in the shop.	-Textbook -Projector -Computer -Handouts -Examples of cabinets and tables -Examples of doors and drawers -Examples of various styles of hardware	9.1.12.F.1 9.3.12.D(1).2-4 9.3.12.E.2 9.3.12.E.15 9.3.12.E.26 9.3.12.E.30 9.3.12.E.32	8.2.12.D.1 8.2.12.D.3 8.2.12.D.5	**Formative Assessments:** 1. Quizzes on cabinet, drawer and door construction. 2. Cabinet making exercise (wood joints, face frames, shelves, etc.) 3. Door and Drawer exercises (raised panels, sliding doors, hardware installation, etc.) 4. Observation of cabinet, door and drawer design. 5. Group discussion on hardware selection. **Summative Assessment(s)** -Benchmark TEST -Midterm EXAM -Final Exam

Topics/Concepts (Incl. time / # days per topic)	Critical Content (Students Will Know :)	Skill Objectives (Students Will Be Able To :)	Instructional/Learning Activities & Interdisciplinary Connections	Instructional Resources	Technology & 21st C Skills Integration (Specify)	NJSLS w/ CPI Reference	Evaluation/ Assessment:
2. Be sure all pieces are square and true E. Assembly 1. Prep for doweling 2. Drill hole for dowels 3. Dry fitting a. Number each piece 4. Glue and clamp F. Sanding 1. Sand with medium grit a. Remove all glue marks b. Fix any scratches or dents 2. Finish Sanding G. Finishing 1. Color selection 2. Remove dust 3. Apply stain 4. Apply several coats of poly a. Lightly sand with steel wool between coats	12. How to read write a bill of materials. 13. How to follow a plan of procedures. 14. The most effective tool and technique for the desired application. 15. Hand tools vs. power tools.	10. Design and construct raised panel doors. 11. Select appropriate door and drawer hardware for a given project. 12. Interpret a project plan to complete a desired project. 13. Select the proper tool for the job. 14. Choose the proper technique to achieve the desired outcome. 15. Operate hand tools safely and effectively. 16. Operate power tools safely and effectively.	4. Information sheets will be given to each student and safe techniques will be explained. 5. Students use each machine under the direction and observation of the teacher. 6. Students take a quiz on each machine.				

Unit Modifications for Special Population Students:

Struggling Learners	Gifted and Talented Students (Challenge Activities)	English Language Learners	Learners with an IEP	Learners with a 504
• Assist students in getting organized. • Give short directions. • Use drill exercises. • Give prompt cues during student performance. • Let students with poor writing skills use a computer. • Break assignments into small segments and assign only one segment at a time. • Demonstrate skills and have students model them. • Give prompt feedback. • Use continuous assessment to mark students' daily progress. • Prepare materials at varying levels of ability.	• Provide ample opportunities for creative behavior. • Create assignments that call for original work, independent learning, critical thinking, problem solving, and experimentation. • Show appreciation for creative efforts • Respect unusual questions, ideas, and solutions. • Encourage students to test their ideas. • Provide opportunities and give credit for self-initiated learning. • Avoid overly detailed supervision and too much reliance on prescribed curricula. • Allow time for reflection. • Resist immediate and constant evaluation. • Avoid comparisons to other students.	• Use a slow, but natural rate of speech; speak clearly; use shorter sentences; repeat concepts in several ways. • When possible, use pictures, photos, and charts. • Corrections should be limited and appropriate. Do not correct grammar or usage errors in front of the class. • Give honest praise and positive feedback through your voice tones and visual articulation whenever possible. • Encourage students to use language to communicate, allowing them to use their native language to ask/answer questions when they are unable to do so in English. • Integrate students' cultural background into class discussions. • Use cooperative learning where students have opportunities to practice expressing ideas without risking language errors in front of the entire class.	Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org	• Refer to page four in the Parent and Educator Guide to Section 504 to assist in the development of appropriate plans.

UNIT OVERVIEW

Course Title: Advanced Processing and Production Systems

Unit #: **UNIT 7 OVERVIEW** **Unit Title:** Design Project

Unit Description and Objectives:

Students will be able to independently use their learning from Materials Processing and Production Systems to design and construct a capstone project / projects that solves a real world problem or need.

Essential Questions and Enduring Understandings:

Essential Questions:	**Enduring Understandings/Generalizations** **Students will understand that:**	**Guiding Questions**
1. How do you classify something as a problem?	1. There is more than one way to solve a problem.	1.1 Is there such a thing as the perfect solution? 1.2 What is good design?
2. What are the best choices of basic tools; materials and techniques woodworkers use to get a desired result?	2. There are a variety of tools and techniques a woodworker can use to create a desired product.	2.1 How do woodworkers choose tools, techniques, and materials to express their ideas? 2.2 Can you be successful without good time management?

CURRICULUM UNIT PLAN

Course Title/Grade: Advanced Materials Processing and Production Systems/ 10-12
Unit Number/Title: Unit 7-Design Project
Conceptual Lens:
Appropriate Time Allocation (# of Days)**:** 16 weeks

Primary Content Standards referenced With Cumulative Progress Indicators			
9.1.12.F.1	9.3.12.E.15	9.3.12.E.32	
9.3.12.D(1).2-4	9.3.12.E.26		
9.3.12.E.2	9.3.12.E.30		

Topics/Concepts (Incl. time / # days per topic)	Critical Content (Students Will Know :)	Skill Objectives (Students Will Be Able To :)	Instructional/Learning Activities & Interdisciplinary Connections	Instructional Resources	Technology & 21st C Skills Integration (Specify)	NJSLS w/ CPI Reference	Evaluation/ Assessment:
A. Choose a project 1. Brainstorm several ideas 2. Choose the best idea 3. Make a detailed sketch a. Scale and ratio b. Material thickness B. Select and prepare materials 1. Aesthetics 2. Project location/use 3. Material strength 4. Direction of wood grain 5. Mix of materials C. Measuring 1. Accurately	1. The steps of the design loop. 2. The most effective tool and technique for the desired application. 3. How to effectively manage their time and given resources	1. Identify problems. 2. Frame a design brief. 3. Research and investigate. 4. Generate alternate solutions. 5. Choose the best solution. 6. Create/test/evaluate a prototype. 7. Reflect and redesign to compensate for design flaws. 8. Select the proper tool for the job. 9. Choose the proper technique to achieve the desired outcome. 10. Create bill of materials 11. Calculate cost of a	1. Lecture and class discussion 2. Definitions will be given for new terms and the students will begin to develop a vocabulary. 3. Questions and answers 4. Reading assignments from the text. 5. Review of deign loop 6. The demonstration of various types of projects 7. Information sheets will be given to each student and safe techniques will be explained.	-Textbook -Projector -Computer -Handouts -Examples of projects made by other students -Machines -Hand tools	9.1.12.F.1 9.3.12.D(1).2-4 9.3.12.E.2 9.3.12.E.15 9.3.12.E.26 9.3.12.E.30 9.3.12.E.32	8.2.12.D.1 8.2.12.D.3 8.2.12.D.5	**Formative Assessments:** 1. Quiz on design process 2. Quiz on material selection 3. Quiz on measuring and material thickness **Summative Assessment(s)** -Benchmark TEST -Midterm EXAM -Final EXAM

Topics/Concepts (Incl. time / # days per topic)	Critical Content (Students Will Know :)	Skill Objectives (Students Will Be Able To :)	Instructional/Learning Activities & Interdisciplinary Connections	Instructional Resources	Technology & 21st C Skills Integration (Specify)	NJSLS w/ CPI Reference	Evaluation/ Assessment:
measure your work 2. Use same ruler through production D. Cutting 1. Give each task your full attention 2. Plan each cut 3. Cutting on the correct side of the line E. Assembly 1. Dry fitting 2. Clamping and gluing F. Finishing 1. Sanding 2. Staining		given project 12. Calculate board feet	8. Students use each machine under the direction and observation of the teacher. 9. Students take a quiz on measuring				

Unit Modifications for Special Population Students:

Struggling Learners	Gifted and Talented Students (Challenge Activities)	English Language Learners	Learners with an IEP	Learners with a 504
• Assist students in getting organized. • Give short directions. • Use drill exercises. • Give prompt cues during student performance. • Let students with poor writing skills use a computer. • Break assignments into small segments and assign only one segment at a time. • Demonstrate skills and have students model them. • Give prompt feedback. • Use continuous assessment to mark students' daily progress. • Prepare materials at varying levels of ability.	• Provide ample opportunities for creative behavior. • Create assignments that call for original work, independent learning, critical thinking, problem solving, and experimentation. • Show appreciation for creative efforts • Respect unusual questions, ideas, and solutions. • Encourage students to test their ideas. • Provide opportunities and give credit for self-initiated learning. • Avoid overly detailed supervision and too much reliance on prescribed curricula. • Allow time for reflection. • Resist immediate and constant evaluation. • Avoid comparisons to other students.	• Use a slow, but natural rate of speech; speak clearly; use shorter sentences; repeat concepts in several ways. • When possible, use pictures, photos, and charts. • Corrections should be limited and appropriate. Do not correct grammar or usage errors in front of the class. • Give honest praise and positive feedback through your voice tones and visual articulation whenever possible. • Encourage students to use language to communicate, allowing them to use their native language to ask/answer questions when they are unable to do so in English. • Integrate students' cultural background into class discussions. • Use cooperative learning where students have opportunities to practice expressing ideas without risking language errors in front of the entire class.	Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org	• Refer to page four in the Parent and Educator Guide to Section 504 to assist in the development of appropriate plans.

UNIT OVERVIEW

Course Title: Advanced Materials and Production Systems

Unit #: **UNIT 8 OVERVIEW** **Unit Title:** Manufacturing and Mass Production

Unit Description and Objectives:

Discuss jigs and fixtures and how they affect production. Students will work on mass production project utilizing fundamental conventional skills. This also includes the use of instruments, equipment, geometric assemblies and constructions that enable the communication of design ideas in technical terms, for purposes of general understanding and industrial fabrication

Essential Questions and Enduring Understandings:

Essential Questions:	Enduring Understandings/Generalizations Students will understand that:	Guiding Questions
1. What are the benefits of using CNC in production?	1. Using computers has greatly increased productivity in manufacturing	1.1 What does CNC stand for 1.2 What is flexible manufacturing

2. What are the benefits mass production?	2. The manufacture of a product in large numbers and at low cost is called mass production.	2.1 Name a few products that are mass produced? 2.2 What is a production line?

CURRICULUM UNIT PLAN

Course Title/Grade: Advanced Materials Processing and Production Systems
Unit Number/Title: Unit 8-Manucacturing and Mass Production
Conceptual Lens:
Appropriate Time Allocation (# of Days)**:** 10 weeks

Primary Content Standards referenced With Cumulative Progress Indicators			
9.1.12.F.1	9.3.12.E.15	9.3.12.E.32	
9.3.12.D(1).2-4	9.3.12.E.26		
9.3.12.E.2	9.3.12.E.30		

Topics/Concepts (Incl. time / # days per topic)	Critical Content (Students Will Know :)	Skill Objectives (Students Will Be Able To :)	Instructional/Learning Activities & Interdisciplinary Connections	Instructional Resources	Technology & 21st C Skills Integration (Specify)	NJSLS w/ CPI Reference	Evaluation/ Assessment:
A. Developing a product 1. Analyze need 2. Frame a design brief 3. Gather information 4. Brainstorm 5. Choose best solution 6. Development 7. Prototype 8. Test and evaluate 9. Re-design, re-implement B. Set up for production 1. Flow chart 2. Jigs 3. Fixtures C. Production run 1. Quality control a. Go/No go 2. Sanding 3. Assembly 4. Finishing	1. How to use the Design Loop to design a product 2. The various types of production 3. The different types of manufacturing 4. The steps involved in marketing a product	1. Produce a set of working drawings for the product they manufacture 2. Work as part of a manufacturing team to develop a product 3. Construct the jigs and fixtures necessary for producing a product 4. Produce a flow chart 5. Use the Design Loop to solve any problems that may arise during production	1. Lecture and class discussion 2. Definitions will be given for new terms and the students will begin to develop a vocabulary. 3. Questions and answers 4. Reading assignments from the text. 5. Review of deign loop 6. The demonstration of various types of jigs and fixtures. 7. Information sheets will be given to each student and safe techniques will be explained. 8. Students use each machine under the direction and observation of the teacher. 9. Students take a quiz on manufacturing and mass production.	-Textbook -Projector -Computer -Handouts -Examples of projects made using manufacturing techniques -Examples of various jigs and fixtures -Examples of Go/No-go set-ups	9.1.12.F.1 9.3.12.D(1).2-4 9.3.12.E.2 9.3.12.E.15 9.3.12.E.26 9.3.12.E.30 9.3.12.E.32	8.2.12.D.1 8.2.12.D.3 8.2.12.D.5	**Formative Assessments:** 1. Quizzes on product development 2. Vocabulary quiz 3. Exercises how to make a flow chart 4. Exercises on making jigs and fixtures. **Summative Assessment(s)** -Benchmark TEST -Midterm EXAM -Final Exam

Unit Modifications for Special Population Students:

Struggling Learners	Gifted and Talented Students (Challenge Activities)	English Language Learners	Learners with an IEP	Learners with a 504
• Assist students in getting organized. • Give short directions. • Use drill exercises. • Give prompt cues during student performance. • Let students with poor writing skills use a computer. • Break assignments into small segments and assign only one segment at a time. • Demonstrate skills and have students model them. • Give prompt feedback. • Use continuous assessment to mark students' daily progress. • Prepare materials at varying levels of ability.	• Provide ample opportunities for creative behavior. • Create assignments that call for original work, independent learning, critical thinking, problem solving, and experimentation. • Show appreciation for creative efforts • Respect unusual questions, ideas, and solutions. • Encourage students to test their ideas. • Provide opportunities and give credit for self-initiated learning. • Avoid overly detailed supervision and too much reliance on prescribed curricula. • Allow time for reflection. • Resist immediate and constant evaluation. • Avoid comparisons to other students.	• Use a slow, but natural rate of speech; speak clearly; use shorter sentences; repeat concepts in several ways. • When possible, use pictures, photos, and charts. • Corrections should be limited and appropriate. Do not correct grammar or usage errors in front of the class. • Give honest praise and positive feedback through your voice tones and visual articulation whenever possible. • Encourage students to use language to communicate, allowing them to use their native language to ask/answer questions when they are unable to do so in English. • Integrate students' cultural background into class discussions. • Use cooperative learning where students have opportunities to practice expressing ideas without risking language errors in front of the entire class.	Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be	• Refer to page four in the Parent and Educator Guide to Section 504 to assist in the development of appropriate plans.

			applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org	

CROSS-CONTENT STANDARDS ANALYSIS

Course Title: Advanced Materials Processing and Production Systems **Grade:** 10-12

Unit Title:	Visual and Performing Arts	Comp. Health & Physical Ed.	Language Arts Literacy	Mathematics	Science	Social Studies	World Languages	Tech. Literacy	Career Education/ Consumer, Family & Life Skills
Intro to Course and Room Procedures	1.1.2.D.1 1.1.2.D.2		NJSLS: Gr.11-12, RST 4 NJSLS: Gr.11-12, RST 3 NJSLS: Gr.11-12, WHST 10 NJSLS: Gr.11-12, WHST 1.c					8.2A3	9.4.12.D(1).2-4 9.4.12.E.2 9.4.12.E.15 9.4.12.E.26 9.4.12.E.30 9.4.12.E.32
Careers			Gr.11-12, RST1,3,4,8,10 Gr. 11-12,WHST 1.a,1.c,6,10 Gr. 9-10, RST 1,3,4,10 Gr. 9-10 RST 1,3,4,10 Gr. 9-10 WHST1.a,1.c,2.a	Gr. 11-12, N-Q1-2					9.3.12.C.2 9.3.12.AC.4,5,7
Designing, Planning, and measurement	**1.1.2.D.1** **1.1.2.D.**		CSS: Gr.11-12, RST 1 NJSLS: Gr.11-12, RST 3 NJSLS: Gr.11-12, RST 4 NJSLS: Gr.11-12, RST 8 NJSLS: Gr.11-12, WHST 1.a NJSLS: Gr.11-12	NJSLS: Gr.11-12 N-Q, 1-3	5.1.12.A.3 5.1.12.A.2 5.1.12.A.1 5.1.12.B.1 5.1.12.B.2 5.1.12.D.1	6.1.12.C.12.d 6.1.12.C.16.a 6.2.12.C.3.d 6.2.12.C.4.b 6.2.12.B.6.a 6.2.12.C.6.b 6.2.12.C.6.			9.1.12.A.1-4 9.1.12.B.1-3 9.1.12.C.1 9.4.12.D(1).2-4 9.4.12.E.2 9.4.12.E.15 9.4.12.E.26 9.4.12.E.30 9.4.12.E.32

Hand Tools		2.1.2.D.1 2.1.4.D.1 2.1.6.D.1 2.2.6.B.1 2.2.6.B.2 2.5.P.A.1 2.5.P.A.2	NJSLS: Gr.11-12, RST 3 NJSLS: Gr.11-12, RST 4 NJSLS: Gr.11-12, WHST 1.a		5.1.12.A.1 5.1.12.B.1 5.1.12.B.2	6.1.12.C.12.d 6.1.12.C.16.a 6.2.12.C.3.d 6.2.12.C.4.b 6.2.12.B.6.a 6.2.12.C.6.b 6.2.12.C.6.d			9.1.12.F.1 9.4.12.D(1).2-4 9.4.12.E.2 9.4.12.E.15 9.4.12.E.26 9.4.12.E.30 9.4.12.E.32
Power Tools	1.1.2.D.1 1.1.2.D.2	2.1.2.D.1 2.1.4.D.1 2.1.6.D.1 2.2.6.B.1 2.2.6.B.2 2.5.P.A.1 2.5.P.A.2	NJSLS: Gr.11-12, RST 3 NJSLS: Gr.11-12, RST 4 NJSLS: Gr.11-12, WHST 1.a NJSLS: Gr.11-12, WHST 1.c NJSLS: Gr.11-12, WHST 6	NJSLS: Gr.11-12 N-Q, 1	5.1.12.A.1 5.1.12.B.1 5.1.12.B.2	6.1.12.C.12.d 6.1.12.C.16.a 6.2.12.C.3.d 6.2.12.C.4.b 6.2.12.B.6.a 6.2.12.C.6.b 6.2.12.C.6.d			9.1.12.F.1 9.4.12.D(1).2-4 9.4.12.E.2 9.4.12.E.15 9.4.12.E.26 9.4.12.E.30 9.3.12.E.32
Furniture design	1.1.2.D.1 1.1.2.D.2		CSS: Gr.11-12, RST 1 NJSLS: Gr.11-12, RST 3 NJSLS: Gr.11-12, RST 4 NJSLS: Gr.11-12, RST 8 NJSLS: Gr.11-12, WHST 1.a NJSLS: Gr.11-12	NJSLS: Gr.11-12 N-Q, 1-3	5.1.12.A.3 5.1.12.A.2 5.1.12.A.1 5.1.12.B.1 5.1.12.B.2 5.1.12.D.1	6.1.12.C.12.d 6.1.12.C.16.a 6.2.12.C.3.d 6.2.12.C.4.b 6.2.12.B.6.a 6.2.12.C.6.b 6.2.12.C.6.d		8.1B12, 8.2B6,C1-3	9.1.12.A.1-4 9.1.12.B.1-3 9.1.12.C.1 9.4.12.D(1).2-4 9.4.12.E.2 9.4.12.E.15 9.4.12.E.26 9.4.12.E.30 9.4.12.E.32
Design Project	1.1.2.D.1 1.1.2.D.2		CSS: Gr.11-12, RST 1 NJSLS: Gr.11-12, RST 3 NJSLS: Gr.11-12, RST 4 NJSLS: Gr.11-12, RST 8 NJSLS: Gr.11-12, WHST 1.a NJSLS: Gr.11-12	NJSLS: Gr.11-12 N-Q, 1-2	5.1.12.A.3 5.1.12.A.2 5.1.12.A.1 5.1.12.B.1 5.1.12.B.2 5.1.12.D.1	6.1.12.C.12.d 6.1.12.C.16.a 6.2.12.C.3.d 6.2.12.C.4.b 6.2.12.B.6.a 6.2.12.C.6.b 6.2.12.C.6.d		8.1B12, 8.2B6,C1-3	9.1.12.A.1-4 9.1.12.B.1-3 9.1.12.C.1 9.4.12.D(1).2-4 9.4.12.E.2 9.4.12.E.15 9.4.12.E.26 9.4.12.E.30 9.4.12.E.32
Manufacturing	1.1.2.D.1 1.1.2.D.2	2.1.2.D.1 2.1.4.D.1 2.1.6.D.1 2.2.6.B.1 2.2.6.B.2 2.5.P.A.1 2.5.P.A.2	NJSLS: Gr.11-12, RST 3 NJSLS: Gr.11-12, RST 4 NJSLS: Gr.11-12, WHST 1.a NJSLS: Gr.11-12, WHST 1.c NJSLS: Gr.11-12, WHST 6	N-Q, 1-3 NJSLS: Gr.11-	5.1.12.A.3 5.1.12.A.2 5.1.12.A.1 5.1.12.B.1 5.1.12.B.2 5.1.12.D.1	6.1.12.C.12.d 6.1.12.C.16.a 6.2.12.C.3.d 6.2.12.C.4.b 6.2.12.B.6.a 6.2.12.C.6.b 6.2.12.C.6.d			9.1.12.F.1-2 9.4.12.D(1).2-4 9.4.12.E.2 9.4.12.E.15 9.4.12.E.26 9.4.12.E.30 9.4.12.E.32

***All content areas may not be applicable in a particular course.**

Washington Township Public Schools
Department of Student Personnel Services

CURRICULUM MODIFICATION

The regular curriculum is modified for Special Education students enrolled in both self-contained and resource center classes.

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- Variation of output: adapting how a student can respond to instruction
- Variation of size: adapting the number of items the student is expected to complete
- Modifying the content, process or product

Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here.

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