Unit 5: Individual Project

Content Area: **Industrial Technology**
Course(s): **Manufacturing Tech III/ IV**
Time Period: **year**
Length: **40 Weeks**
Status: **Published**

Unit Overview

SWBAT select an advanced individual project from the Internet, Student Drawing or teacher provided drawing to complete during each marking period.

Transfer

Students will select projects that they have selected from a Student Drawing or teacher provided drawin has provided that encompass some or all of the skills previously taught in earlier lessons by the instructors. Students will be required to select these projects and turn the completed projects in at the end of each marking period.

For more information, read the following article by Grant Wiggins.

http://www.authenticeducation.org/ae_bigideas/article.lasso?artid=60

Meaning

SWBAT select a project they would like to manufacture using a machinist print.

Understandings

Students will understand that...

How the skills they have acquired can be applied to manufacture a project they are interested in making.

Essential Questions

Students will keep considering...

What is technology?

How does various types of technology contribute to advaces in industry?

What are the types of careers available in Manufacturing?

How can the skills that have been learned lead to a career?

How can I apply the skills to benefit financially?

What is the importance of accurate measurement and layout when creating a finished project?

Is craftsmanship important when completing a project?

What will happen if my fastening is not sturdy and aesthetically pleasing on my project?

Application of Knowledge and Skill

Students will work in different areas to apply the knowledge they have acquired in Sheet Metal Work, Foundry and Forging, Soldering, Brazing and Welding and Machining to create a finished project.

Students will know...

Students will know that safety rules must be followed when beginning work in the Manufacturing Lab.

Students will wear Safety Glasses or Safety Goggles at all times when working in the shop.

Students will be able to operate safety apparatus like the eyewash, chemical shower, fire blanket, fire

extinguisher and first aid kit location.

Students will be able to locate and operate lab power safety shutoff buttons in the Man. tech Lab.

Students will dress appropriately when working in the lab.

dentify basic measuring tools and gages and explain how they are used.

Measure to 1/16th and .05 mm with a steel rule.

Read drawings dimensioned in fractional and decimal inches and metric dimensions.

Identify and understand the different types of information indicated on a typical drwing.

Describe how detail, assembly, and subassembly drawing differ.

Explain the purpose of sa layout and how it is used tp prepare metal for machining.

Identify common layout tools and use them safely.

Make simple layouts.

List and observe common safety precautions used in layout work.

Identify basic hand tools used in metalworking.

Select right tool for the job

Explain how to maintain tools properly.

Safely Operate and identify parts of basic sheet metal machines.

Safely Operate Spotwelders.

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SWBAT ram up a foundry project and cut the gating system to allow metal to flow into the pattern.

SWBAT wear the proper safety equipment for handling molten metal.

SWBAT safely charge the crucible with aluminum and light the crucible furnace.

SWBAT safely pour molten metal into gating system.

SWBAT machine and polish metal casting.

SWBAT heat steel up to proper temperature and use metal tongs and proper blacksmithing tools to shape metal.

How to safely tin soldering iron and use flux to soft solder?

How to safely set up oxyacetylene welder to braze, weld and cut using torch and cutting torch.

How to select arc welding electrodes, arc welding current selection and weld assessment and weld project

Students will be skilled at...

Students will be skilled at...

Being able to apply Critical Thinking Skills to select what type of processes they will need to complete their selected projects.

Recalling information on past processes to set up equipment and machinery.

Following proper safety procedures when operating hand tools and powered machinery or equipment.

Academic Vocabulary

dial indicators

gage blocks

graduations

International System of Units

steel rule

combination set

divider

hermaphrodite caliper

layout dye

reference lines

scriber

square

ball peen hammer

abrasive

anodizing

buffing

painting

polishing

grinding

Learning Goal 1

SWBAT manufacture Individual Project with a machinist print or welding print.

CAEP.9.2.12.C.2	Modify Personalized Student Learning Plans to support declared career goals.
CAEP.9.2.12.C.3	Identify transferable career skills and design alternate career plans.
CAEP.9.2.12.C.4	Analyze how economic conditions and societal changes influence employment trends and future education.
CAEP.9.2.12.C.6	Investigate entrepreneurship opportunities as options for career planning and identify the knowledge, skills, abilities, and resources required for owning and managing a business.
CAEP.9.2.12.C.7	Examine the professional, legal, and ethical responsibilities for both employers and employees in the global workplace.
CAEP.9.2.12.C.8	Assess the impact of litigation and court decisions on employment laws and practices.
CAEP.9.2.12.C.9	Analyze the correlation between personal and financial behavior and employability.
MANU.9-12.9.4.12.M.(2).8	Maintain equipment, tools, and workstations to provide safe work environments and meet company regulations.

MANU.9-12.9.4.12.M.(4).8	Inspect manufacturing materials, report quality issues, and release only manufacturing materials that meet quality specifications.
MANU.9-12.9.4.12.M.(6).7	Demonstrate the safe use of manufacturing equipment in order to assure heath and safety in work environments.
MANU.9-12.9.4.12.M.1	Demonstrate language arts knowledge and skills required to pursue the full range of postsecondary education and career opportunities.
MANU.9-12.9.4.12.M.2	Demonstrate mathematics knowledge and skills required to pursue the full range of postsecondary education and career opportunities.
MANU.9-12.9.4.12.M.3	Demonstrate science knowledge and skills required to pursue the full range of postsecondary education and career opportunities.
MANU.9-12.9.4.12.M.4	Select and employ appropriate reading and communication strategies to learn and use technical concepts and vocabulary in practice.
MANU.9-12.9.4.12.M.7	Evaluate and use information resources to accomplish specific occupational tasks.
MANU.9-12.9.4.12.M.12	Develop and interpret tables, charts, and figures to support written and oral communications.
MANU.9-12.9.4.12.M.16	Employ critical thinking and interpersonal skills to resolve.
MANU.9-12.9.4.12.M.21	Operate Internet applications to perform tasks.
MANU.9-12.9.4.12.M.33	Demonstrate knowledge of personal and jobsite safety rules and regulations to maintain safe and healthful working conditions and environments.
MANU.9-12.9.4.12.M.35	Identify emergency procedures that are necessary to provide aid in workplace accidents.
MANU.9-12.9.4.12.M.56	Demonstrate skills in evaluating and comparing employment opportunities in order to accept employment positions that match career goals.

Target 1

SWBAT use the internet, teacher project folder, or drawing from student on the Individual Project they would like to manufacture.

Target 2

Students will transfer print dimensions on to metal stock using the proper techniques and begin cutting out stock.

Learning Goal 2

SWBAT begin manufacturing project incorporating the skills they have learned from previous lessons such as machining, welding, forging casting, assembly techniques such as fasteners. Once project is assembled

students will apply a finish to the project..

CAEP.9.2.12.C.1	Review career goals and determine steps necessary for attainment.
CAEP.9.2.12.C.2	Modify Personalized Student Learning Plans to support declared career goals.
CAEP.9.2.12.C.3	Identify transferable career skills and design alternate career plans.
CAEP.9.2.12.C.4	Analyze how economic conditions and societal changes influence employment trends and future education.
CAEP.9.2.12.C.5	Research career opportunities in the United States and abroad that require knowledge of world languages and diverse cultures.
CAEP.9.2.12.C.6	Investigate entrepreneurship opportunities as options for career planning and identify the knowledge, skills, abilities, and resources required for owning and managing a business.
CAEP.9.2.12.C.7	Examine the professional, legal, and ethical responsibilities for both employers and employees in the global workplace.
CAEP.9.2.12.C.8	Assess the impact of litigation and court decisions on employment laws and practices.
MANU.9-12.9.4.12.M.(1).2	Research new manufacturing processes to manage production of new and/or improved products.
MANU.9-12.9.4.12.M.(1).6	Assess and select a variety of techniques and solutions to ensure safe production of products as well as safe and productive workplaces.
MANU.9-12.9.4.12.M.(2).5	Summarize and employ safety protocols to maintain a safe and productive production workplace.
MANU.9-12.9.4.12.M.(2).6	Research the safe use of manufacturing process equipment in order to protect personal well-being in the work environment.
MANU.9-12.9.4.12.M.(3).4	Demonstrate knowledge of the safe use of manufacturing equipment in order to ensure safety during maintenance, installation, and repair work.
MANU.9-12.9.4.12.M.(4).4	Demonstrate understanding of ways to enhance product and process to meet quality standards.
MANU.9-12.9.4.12.M.(4).8	Inspect manufacturing materials, report quality issues, and release only manufacturing materials that meet quality specifications.
MANU.9-12.9.4.12.M.(6).6	Evaluate and summarize training in health, safety, and/or environmental issues needed to provide safe, healthy, and productive manufacturing work environments.
MANU.9-12.9.4.12.M.1	Demonstrate language arts knowledge and skills required to pursue the full range of postsecondary education and career opportunities.
MANU.9-12.9.4.12.M.2	Demonstrate mathematics knowledge and skills required to pursue the full range of postsecondary education and career opportunities.
MANU.9-12.9.4.12.M.3	Demonstrate science knowledge and skills required to pursue the full range of postsecondary education and career opportunities.
MANU.9-12.9.4.12.M.12	Develop and interpret tables, charts, and figures to support written and oral communications.
MANU.9-12.9.4.12.M.16	Employ critical thinking and interpersonal skills to resolve.
MANU.9-12.9.4.12.M.19	Employ technological tools to expedite workflow.
MANU.9-12.9.4.12.M.27	Employ computer operations applications to manage tasks.
MANU.9-12.9.4.12.M.28	Use computer-based equipment (containing embedded computers or processors) to control devices.
MANU.9-12.9.4.12.M.33	Demonstrate knowledge of personal and jobsite safety rules and regulations to maintain safe and healthful working conditions and environments.

MANU.9-12.9.4.12.M.39	Maintain safe and healthful working conditions and environments to ensure employee safety.
MANU.9-12.9.4.12.M.45	Employ organizational skills to foster positive working relationships and accomplish organizational goals.
MANU.9-12.9.4.12.M.49	Employ mentoring skills to assist others.
MANU.9-12.9.4.12.M.50	Apply ethical reasoning to a variety of situations in order to make ethical decisions.
MANU.9-12.9.4.12.M.52	Identify and demonstrate positive work behaviors and personal qualities needed to succeed in the classroom and/or to be employable.
MANU.9-12.9.4.12.M.54	Demonstrate skills related to seeking and applying for employment in a desired job.
MANU.9-12.9.4.12.M.57	Identify and exhibit traits for retaining employment.
MANU.9-12.9.4.12.M.64	Employ planning and time management skills and tools to enhance results and complete work tasks.
MANU.9-12.9.4.12.M.65	Describe and employ technical knowledge and skills required for careers in manufacturing in order to perform basic workplace activities.

Target 1

SWBAT work in the manufacturing lab cutting out stock and deburring material.

Target 2

Students will work in the shop operating machinery and equipment they have been trained on to complete the project they have selected. After completion of project they will apply a finish by painting or buffing using finishing techniques.

Proficiency Scale

Summative Assessment

Students will be able to pass a safety test on shop safety rules. Students must pass the test to work in the Manufacturing Lab on the welding and cutting machines.

21st Century Life and Careers

CAEP.9.2.12.C	Career Preparation
CAEP.9.2.12.C.1	Review career goals and determine steps necessary for attainment.
CAEP.9.2.12.C.2	Modify Personalized Student Learning Plans to support declared career goals.
CAEP.9.2.12.C.3	Identify transferable career skills and design alternate career plans.
CAEP.9.2.12.C.4	Analyze how economic conditions and societal changes influence employment trends and future education.
CAEP.9.2.12.C.6	Investigate entrepreneurship opportunities as options for career planning and identify the knowledge, skills, abilities, and resources required for owning and managing a business.
CAEP.9.2.12.C.9	Analyze the correlation between personal and financial behavior and employability.

Formative Assessment and Performance Opportunities

Students will be observed to make sure they are following safety rules and wearing proper safety equipment by the instructor and other students. Students will be graded on project rubric and craftsmanship

Accommodations/Modifications

Students may select more diifficult projects based on skill levels.

Unit Resources

Internet to research projects.

Autodesk Inventor software to draw projects.

Modern Metalworking Instructor's Manual by John R. Walker

Modern Metalworking Textbook by John R. Walker

Modern Metalworking Workbook by John R. Walke