Unit 8: Fasteners and Thread Identification

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

Unit Overview

Manufactured products are assembled by many different methods including screws, nuts, bolts, pins, staples, and adhesives. Selecting the proper fasteners for a job can often result in considerable savings while still providing an assembly that meets design standards. Designers, engineers, and skill workers must be familiar with many types of fasteners. Threaded sections have many applications in our everyday life. A thread is the spiral or helical ridge found on nuts and bolts. When required on a job, threads are indicated on plans and drawings in a special way. They are specified by diameter and number of threads per inch. The suffix indicates the thread series.

Transfer

Students will be able to independently use their learning to...

Pick the proper fasteners and thread types for their individual projects.

Identify the proper thread type or fastener they would need to do repairs at home or in the work place.

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

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

Meaning

SWBAT select the correct fasteners for assembly of projects or items from home or the workplace. If they need to purchase a fastener it is very important that they select the correct thread type or they may strip or ruin the part or equipment they are trying to repair.

Understandings

Students will understand that...

There are many types of fasteners and thread types for assembling products, and materials together. Special fasteners are needed for special applications.

The students to have the ability to recognize and check for the proper fastener they need and how to check if they have selected the proper fastener and thread type.

Essential Questions

Students will keep considering...

Descibe how threads are specified on drawings?

Explain thread nomenclature.

Select the proper tap and tap wrench for the each job.

Determine the correct tap drill size for specified threads.

How to adjust a die for different classes of fit.

How to correct problems that may occur when hand threading.

How to clean and store threading tools properly.

Follow hand threading safety rules.

How to Identify several types of fasteners.

Explain why inch based fasteners are not interchangeable with metric based fasteners.

What would be the the proper fastening technique for the job they're working on.

What are the application of permanenet fasteners.

What are chemical fastening techniques.

Application of Knowledge and Skill

Students will apply the knowledge and skill they have obtained from the lessons to construction of their individual projects and repair of machinery and equipment in Manufacturing Lab.

Students will know...

Students will know...

What facts and basic concepts should students know and be able to recall?

Students will be skilled at...

Students will be skilled at...

Identification of fasteners for projects.

Selecting and cutting the proper threads for their projects.

Academic Vocabulary

American National Thread System

die

die stock

tap

tap disintegrator

tap extractor

thread

Unified National Coarse (UNC)

Unified National Fine (UNF)

Unified Thread System

cap screws

cotter pin

dowel pin

insert

key

nut

rivet

setscrew

thread cutting screw

thread forming screw

Learning Goal 1

Students will be able to identify the reasons fo the Unified National Thread System.

12.9.3.MN.1	Evaluate the nature and scope of the Manufacturing Career Cluster and the role of manufacturing in society and in the economy.
12.9.3.MN.3	Comply with federal, state and local regulations to ensure worker safety and health and environmental work practices.
12.9.3.MN.4	Describe career opportunities and means to achieve those opportunities in each of the Manufacturing Career Pathways.
12.9.3.MN.5	Describe government policies and industry standards that apply to manufacturing.
12.9.3.MN.6	Demonstrate workplace knowledge and skills common to manufacturing.
12.9.3.MN-HSE.1	Demonstrate the safe use of manufacturing equipment.
12.9.3.MN-HSE.2	Develop safety plans for production processes that meet health, safety and environmental standards.
12.9.3.MN-HSE.6	Conduct job safety and health analysis for manufacturing jobs, equipment and processes.
12.9.3.MN-MIR.1	Demonstrate maintenance skills and proficient operation of equipment to maximize manufacturing performance.
12.9.3.MN-MIR.5	Implement a preventative maintenance schedule to maintain manufacturing equipment, tools and workstations.
12.9.3.MN-QA.7	Identify inspection processes that ensure products meet quality specifications.

Target 1

SWBAT identify the importance of having a Unified National Thread System so bolts and screws match up on a national level so the proper thread is selected for the part or project they are manufacturing. Metric Thread system will be explained how they are classified.

Target 2

SWBAT apply the skills they have learned to cut internal and external threads by hand with a tap and die. Applying the proper skills to obtain good threads and prevent tool breakage.

Learning Goal 2

SWBAT to identify Threaded Fasteners and various methods to drive the fasteners into a part.

12.9.3.MN.1	Evaluate the nature and scope of the Manufacturing Career Cluster and the role of manufacturing in society and in the economy.
12.9.3.MN.3	Comply with federal, state and local regulations to ensure worker safety and health and environmental work practices.
12.9.3.MN.4	Describe career opportunities and means to achieve those opportunities in each of the Manufacturing Career Pathways.
12.9.3.MN.5	Describe government policies and industry standards that apply to manufacturing.
12.9.3.MN.6	Demonstrate workplace knowledge and skills common to manufacturing.
12.9.3.MN-HSE.1	Demonstrate the safe use of manufacturing equipment.
12.9.3.MN-MIR.1	Demonstrate maintenance skills and proficient operation of equipment to maximize manufacturing performance.
12.9.3.MN-MIR.4	Investigate and employ techniques to maximize manufacturing equipment performance.
12.9.3.MN-PRO.5	Demonstrate the safe use of manufacturing equipment.

Target 1

SWBAT identify and select proper cap screws by thread type using Metric or National screw pitch gage.

Learning Goal 3

SWBAT identify nonthreaded fastening devices and how they are installed.

12.9.3.MN.1	Evaluate the nature and scope of the Manufacturing Career Cluster and the role of manufacturing in society and in the economy.

12.9.3.MN.2	Analyze and summarize how manufacturing businesses improve performance.
12.9.3.MN.3	Comply with federal, state and local regulations to ensure worker safety and health and environmental work practices.
12.9.3.MN.4	Describe career opportunities and means to achieve those opportunities in each of the Manufacturing Career Pathways.
12.9.3.MN.5	Describe government policies and industry standards that apply to manufacturing.
12.9.3.MN.6	Demonstrate workplace knowledge and skills common to manufacturing.
12.9.3.MN-HSE.1	Demonstrate the safe use of manufacturing equipment.
12.9.3.MN-HSE.6	Conduct job safety and health analysis for manufacturing jobs, equipment and processes.
12.9.3.MN-MIR.4	Investigate and employ techniques to maximize manufacturing equipment performance.
12.9.3.MN-MIR.6	Implement an effective, predictive and preventive manufacturing equipment maintenance program.
12.9.3.MN-PPD.5	Develop procedures to create products that meet customer needs.
12.9.3.MN-PRO.4	Coordinate work teams when producing products to enhance production process and performance.
12.9.3.MN-QA.7	Identify inspection processes that ensure products meet quality specifications.

Target 1

SWBAT identify Dowel pins for accurately positioning parts in relation to other parts and proper methods for installation.

Target 2

SWBAT identify the way Drive Pins and Taper along with Spring Pins are used to hold parts in place. Installation of these fasteners students will demonstrate.

Target 3

SWBAT identify how Cotter Pins, Retaining Rings, Rivets and Keyways are used to hold parts together. Students will demonstrate the proper method to remove and install these fasteners.

Summative Assessment

Students will be able to pass a safety test on identification of Thread and Fastener parts along with safety rules when installing these fasteners.

21st Century Life and Careers

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.7	Examine the professional, legal, and ethical responsibilities for both employers and employees in the global workplace.

Formative Assessment and Performance Opportunities

Students will be observed to make sure they are following safety rules and wearing proper safety equipment and installing the proper fasteners and thread types in the correct manner. Students will be graded on project rubric and craftsmanship

Accommodations/Modifications

Students will be able to repair manufacturing equipment in the lab with instructor supervising. Student will be able to do repairs from home projects and school related projects that need to be repaired.

Unit Resources

Modern Metalworking Instructor's Manual by John R. Walker

Modern Metalworking Textbook by John R. Walker

Modern Metalworking Workbook by John R. Walker

Safety Hand outs from NJ and PA. Safety Tests

Videos on Fasteners and Threading in You Tube