



Mechanical Fasteners

Grade Range: Career & Technical Education (CTE)

Lesson Time: 55 minutes

Key Terms Defined

Bolted connection
Hex
Screw connection
Set Screw connection
Stud
Threaded connection

Materials and Resources

Activity Overview

Mechanical fasteners consisting of bolts, nuts, set screws and other fasteners. This activity will emphasize the threaded connection and its correct usage in the assembly process.

Essential Questions

- What is the function of fasteners within the mechanical system?
- What are the different types of fasteners?
- What are the basic characteristics and applications of each type of fastener?

Objectives

- Identify and classify types of fasteners
- Demonstrate correct usage of mechanical fasteners in an assembly process

Introduction

Prior to this activity, students should be familiar with the manufacturing processes of drilling and machining. Ask students to name different types of fasteners. Also ask students if they know of any times the wrong fastener was used and something bad happened. Have students describe what happens if the wrong type of fastener is used.

zSpace Activity

Students should provide answers on the provided worksheet.

Answers may vary. Sample answers are provided below.

1. Launch "Fun2 Advanced Manufacturing Mechanical".
2. Select "Connections".
3. Select "Threaded Connection".
4. Select "Threaded Connection" from the drop down menu.

Teacher Note: Students can scroll through the menu and more easily locate items in the menu by closing out Key Connection.

5. Select “Bolted Connection.”
6. What type of bolted connection is this?

Teacher Notes: Students can select components to see their names at the top of the screen. Students should explain that this is a hex bolted connection.

7. What are three advantages to this type of fastener?

Teacher Note: Students can explain that the hex bolted connection is simple, convenient to disassemble, low cost, and can be used in a wide range of applications.

8. Select “Section” to see the bolt being used as a fastener.
9. Select “Return”.
10. Select “Assembly”.
11. Follow on-screen instructions.

Teacher Note: If needed, review how to assemble.

12. Complete the assembly exercise.
13. Select “Stud Connection” from the “Threaded Connection” menu.
14. What is the difference between the stud connection and the bolted connection?

Teacher Note: Students should explain assembly process.

15. Select “Screw Connection”.
16. Select each of the screws models and complete the chart below.

Screw Model	Description	Possible Uses
Socket Cap Screw		
Hexagon Cap Screw with Round Head		
Slotted Cheese-Head Screw		
Hex Cap Screw		

17. Select “Set Screw Connection”.
18. What are the two types of set screw connections?

Teacher Note: Students should describe the types of set screw connections.

19. Select “Disassembly and Assembly”.
20. Select “Assembly” option.
21. Follow on-screen instructions.
22. Complete the Assembly exercise.

Closing

In conclusion, ask students how many types of fasteners that they can now name. Ask students to provide three facts that they have learned about fasteners.

Have students answer the following question:

Is there a specific order to assembling fasteners?

What is the standard purpose of each screw model?

Differentiation

- Group students heterogeneously to allow students with a strong command of the English language to assist in reading or interpreting questions
- Provide a handout with a list of vocabulary terms and definitions that will appear in the experience
- Allow students to provide answers that are handwritten, typed, or verbal
- Have students work as partners or in small groups