# Hand Tools



## Mid-Valley STEM-CTE HUB

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### Hand Tools

The Hand Tool Kit provides students with hands-on experience using essential tools for measurement, assembly, and basic construction tasks. This kit is designed to introduce fundamental concepts in engineering, construction, and problem-solving, fostering practical skills applicable to a variety of real-world projects.



### **Grade Level**

6th - 12th grades

**Group Size** 

2-4 students per toolset

### **Time Duration**

45 - 90 minutes

### **Content of Kits**

#### Components

- 3x Tool bags
- 3x 9pc wrench set
- 3x small levels
- 3x work gloves
- 3x safety glasses
- 3x microfiber cloths

- 3x hole punch set
- 3x 4 in 1 screw driver
- 3x pliers
- 1x large level
- 1x carpentry square



## Usage

### **Getting Started**

- 1. **Review Safety Procedures** Go over the proper use of each tool, including proper handling techniques and the importance of wearing safety gear like gloves and glasses.
- 2. Introduce the Tools Allow students to explore the toolset, discussing each tool's function and how it applies to real-world construction or engineering tasks.
- 3. **Practice Measurement & Marking** Start with hands-on practice using levels, squares, and wrenches to measure and mark materials accurately.
  - 4. Apply Skills to a Small Project Guide students through a structured activity, such as tightening bolts, leveling a surface, or marking straight lines for cutting.

### Storage

- Keep all tools neatly stored in the provided tool bags to prevent loss and ensure easy transport.
- Wipe down the tools after each session, especially if they've been used on dusty or oily surfaces.

### Troubleshooting

- **Misaligned Measurements:** Doublecheck measurements and use the level and carpentry square for accuracy before making marks or cuts.
- Tools Not Functioning Properly: Ensure that pliers, wrenches, and screwdrivers are clean and undamaged.



## **Activity Guide**

#### Beginner

#### **Tool Identification & Safety**

Students begin by exploring the tools in the kit, learning their names, functions, and best practices for safe handling. The instructor demonstrates proper grip and usage techniques for each tool, emphasizing safety gear such as work gloves and safety glasses. Students then practice handling and using each tool in a controlled setting, such as tightening and loosening bolts with the wrench set or using the screwdrivers to fasten screws into predrilled holes. This activity helps build foundational skills and confidence with hand tools.

#### Intermediate

#### **Measuring & Marking**

Work in pairs or small groups to practice precision measurement using the carpentry square, levels, and hole punch set. They measure and mark designated points on a surface, ensuring straight and level lines. The instructor introduces realworld applications, such as marking for drilling holes or aligning parts for construction. To reinforce accuracy, students can be challenged to mark and check each other's measurements before comparing results. This activity helps develop problem-solving and attention to detail.

#### Advanced

#### Assembly Challenge

Students apply their knowledge in a hands-on challenge where they must work as a team to complete a small construction task. This could involve assembling a simple wooden structure using screws and pliers or creating a level surface using the leveling tools. Each team is responsible for planning, measuring, marking, and executing their build while troubleshooting any issues that arise. This activity fosters teamwork, spatial awareness, and the ability to follow technical instructions.

#### **Extension Activities:**

#### **Real-World Application**

Students are given an open-ended challenge to design and build a useful object or complete a practical task using the tools in the kit. Examples include constructing a tool organizer, repairing or assembling classroom furniture, or designing a mock blueprint for a small woodworking project. They must present their process, including measurement planning, problem-solving strategies, and tool selection. This activity encourages creativity, project management, and critical thinking while reinforcing real-world applications of hand tool skills.

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## **Learning Extensions**

### STEAM Connections: Engineering - Math - Art

### Learning Objectives:

- Develop fundamental hand tool skills, including the proper use of wrenches, screwdrivers, and pliers.
- Understand measurement accuracy using levels, carpentry squares, and hole punches.
- Apply problem-solving skills to complete hands-on construction or repair tasks.
- Practice safety procedures when handling tools and wearing protective equipment.
- Foster teamwork and communication by working in teams to complete building projects.

### **Career Connections:**

- **Carpentry & Construction** Provides hands-on experience with measurement, leveling, and assembly, essential for careers in construction and woodworking.
- **Mechanical Engineering & Maintenance** Develops skills in using hand tools for repairs, maintenance, and mechanical problem-solving.
- **Manufacturing & Fabrication** Introduces tool usage relevant to assembly-line work, metalworking, and product manufacturing.

### **Essential Employability Skills:**

- Critical thinking
- Problem-solving
- Hand-eye coordination
- Teamwork and collaboration
- Attention to Detail
- Safety Awareness





## **Resources and Accessibility**

### **Safety Guidelines**

- **Proper Tool Handling** Always use tools for their intended purpose and follow correct handling techniques to prevent injury.
- Wear Protective Gear Ensure that safety glasses, gloves, and other PPE are worn as needed to protect against debris and sharp objects.
- Safe Work Environment Keep workspaces clear of clutter, store tools properly when not in use, and minimize distractions while using tools.
- Supervised Use Younger students or beginners should use tools under supervision to ensure safe and correct application.
- Emergency Preparedness Have a first-aid kit nearby and ensure students know how to report injuries or tool malfunctions.

### <u>Accessibility</u>

- Adaptive Tools Provide modified or ergonomic tools with grips to accommodate students with limited hand strength or dexterity.
- Alternative Tasks Assign roles that allow all students to participate, such as measuring, marking, or planning, if they cannot handle tools directly.
- Flexible Workspaces Ensure workstations are accessible to wheelchair users or those with mobility challenges, with tools stored at reachable heights.

### Library Catalog



### **Library Resources**



### Feedback

QR to feedback survey

