



## TOPIC OF STUDY

Hand and Power Tools



## KEY TERMS

Maintaining tools  
Manufacturer's  
Specifications

See pg. 55 of reference  
text for complete list.

## LESSON

Hand and Power Tools

## BIG IDEA(S)

Tools are a critical part of the weatherization process.

## OBJECTIVES

Students will:

- Identify solar technology/ weatherization tools and describe examples of their use
- Describe ways that a retrofit installer maintains tools and organizes them for job requirements and easy retrieval
- Describe tool safety for tools and tasks
- Read manufacturer's specification for a specific tool and understand directions

## TASK LIST SUBCATEGORY

- 311 Recognize, identify and safely use hand tools and power tools
- 415 Demonstrate knowledge of manufacturer specifications
- 420 Demonstrate knowledge and use of time management strategies
- 810 Use energy efficiency industry vocabulary
- 811 Prepare and maintain tools and equipment used for energy auditing and weatherization tasks

## OVERVIEW

The purpose of this Lab is to introduce students to the tools that they will be using throughout the program. Instructor will assemble the tools and tasks to demonstrate, describe their use in weatherization and construction, and demonstrate how to use them safely. Students need to understand how keeping tools organized, ready to use, and selected for each job saves time and bother. The importance of reading the directions from manufacturers is also reviewed.

## STANDARDS

### PA/SDP

**CC.3.5.9-10.C.** Reading (Specific Anchor: Key Ideas and Details). Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

## INSTRUCTIONAL

### TEXT/REFERENCES

Energy Conservation Handbook. Pp.55-63

### MATERIALS NEEDED

**Teacher Presentation:** Assemble all tools that are to be demonstrated along with props and materials needed

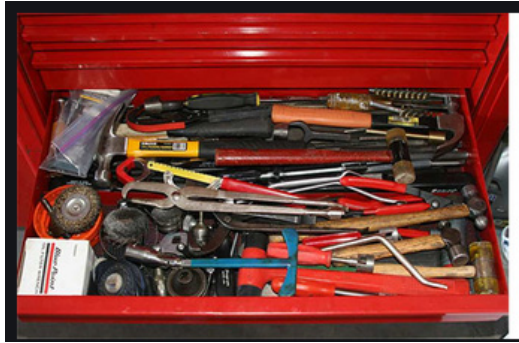
**Content:** Year 1 Lesson 9 worksheet



## IMPLEMENTATION (LESSON PLAN)

### 1. Organization of Tools

In which drawer will you find the tool you need fastest?



- In the Shop or Truck: "Every tool in its place." Tools are often shared so be sure there is enough for everyone, and that they go back where everyone knows to find them.
  - On the Job: Having tools ready for specific jobs in the order of need is a great idea. On p. 157, for this air sealing job of non-IC recessed light fixtures you would have ready the list of Tools, Consumables, and Safety Equipment ahead of time. Think about how they will be carried, loaded and unloaded, cleaned up, and returned. This is all part of the job.
2. Manufacturer's Specifications: It is very important to understand the technical aspects of a tool before using it. This is especially important for power tools which can be dangerous if not used properly. There are directions for things like changing blades and bits, safe operation, and limitations for the tool. Use the Table of Contents below to decide **what section** you would need to read to answer the questions about this circular saw:

<https://images.homedepot-static.com/catalog/pdfimages/b2/b236330b-101b-4751-a981-9c45537f3afa.pdf> Full manual here for this circular saw to check the instructions.

TABLE OF CONTENTS	
CONGRATULATIONS!	2
INTENDED USE	2
<b>SECTION ONE</b>	
GENERAL SAFETY RULES – FOR ALL ELECTRIC POWER TOOLS	2
RECOGNIZE SAFETY SYMBOLS, WORDS AND LABELS	2-3
IMPORTANT SAFEGUARDS	3
WORK AREA	4
ELECTRICAL SAFETY	4
PERSONAL SAFETY	5
TOOL USE AND CARE	5-6
SERVICE	6
<b>SECTION TWO</b>	
SPECIFIC SAFETY RULES AND/OR SYMBOLS	6-7
SAFETY RULES FOR CIRCULAR SAWS	7-8
CAUSES AND PREVENTION OF KICKBACK	8-9
SYMBOLS	9
<b>SECTION THREE</b>	
FUNCTIONAL DESCRIPTION	10
ASSEMBLY	11-13
ATTACHING/REMOVING BLADE	11
MOUNTING THE RIP FENCE	12
CUTTING DEPTH ADJUSTMENT	12-13
BEVEL ANGLE ADJUSTMENT	13
OPERATING THE CIRCULAR SAW	14-17
OPERATING THE ON/OFF SWITCH	14-
GENERAL CUTTING	14-16
POCKET CUTTING	16-17
<b>SECTION FOUR</b>	
MAINTENANCE AND CLEANING	17
ACCESSORIES	18
SPECIFICATIONS	18
OTHER CONSUMER DO-IT-YOURSELF (DIY) TOOLS	18-19
<b>SECTION FIVE</b>	
2 YEAR LIMITED WARRANTY	19-22

- What PPE should you use?
- When should the saw be disconnected from electricity?
- You suspect that the blade is not sharp and you need to change it?
- The saw stops working after using it correctly after 3 months.
- You are going to cut a 1/2" plywood board. How far down should the blade be?

## IMPLEMENTATION (LESSON PLAN) - CONTINUED

3. Demonstrating the Tools (Approx. 45 minutes): The instructor should review demonstration of the procedures before-hand, setting sample jobs where warranted to save time. If any hands-on practice is planned, this lesson will take longer. Make a checklist for smoother sailing.

a. Hand Tools

- i. Screw drivers are mostly flat or Phillips. There are other kinds and different sizes and lengths for getting into odd spots. If time, review when they come in handy. Also demo using a drill for screws with different bits.



- ii. Tool Belt. If you assemble a tool belt, you might want to put in tools for a specific job like making a drywall repair, or sealing an opening around a pipe.

b. Power Tools: to consider time, demo just one of the saws but explain how the others work.

## HOMEWORK

Match the Tool to its Use (Year 1 Lesson 9 Worksheet)

## RESOURCES/LINKS

Straight Cuts with a Circular Saw

<https://www.youtube.com/watch?v=99vUjwFIZuo>

How to Use a Circular Saw

[www.lowes.com/n/how-to/how-to-use-a-circular-saw](http://www.lowes.com/n/how-to/how-to-use-a-circular-saw)

Miter Saw (7:52)

<https://www.youtube.com/watch?v=7fjHvYy5lkg>

Portable Band Saw

<https://www.youtube.com/watch?v=iWXskrhDMHo>

