# Plumbing Overview

Weatherization Installer/Technician Fundamentals

Learning Objectives

By attending this session, participants will be able to:

* Recognize common plumbing tools and materials, their characteristics and uses, and fittings.
* Discuss common hazards and how to resolve them.
* Install faucet aerators, pipe insulation and tank wrap.
* Recognize asbestos.
* List potential water heater replacement types.
* Cite applicable building codes.

Key Terminology

Asbestos

Asbestos Hazard Emergency Response Act (AHERA)

Heat pump water heater

National Fire Protection Association (NFPA)

Rules

Solar water heater

Tankless water heater

Uniform Plumbing Code (UPC)

U.S. Environmental Protection Agency (EPA)

Supplemental Materials

Handouts & Resources

Applicable Codes, or sections thereof, such as the Uniform Plumbing Code (UPC), NFPA 54 or State gas fitting code documents.

Family Handyman. “How to Solder Copper Pipe Joints.” June 2004. <http://www.familyhandyman.com>.

Water Heater Info Toolkit.

Water Heater Hands-on Prop Guide.

Relevant Standard Work Specifications

1.100.1 – Global Worker Safety

Classroom Props & Activities

Typical piping and fitting materials including:

* Copper piping, torch, and solder
* PVC and CPVC pipe and solvent glue
* Galvanized pipe and fittings
* Black iron pipe and fittings
* Plumber’s tape
* PEX piping and fittings, crimping tools
* Pipe cutters, hacksaws, and reciprocating saws

Common plumbing tools, including:

* Propane Torch
* Tongue-and-Groove Pliers
* Hacksaw
* Metal File
* Basin Wrench
* Pipe Wrench
* Hand Auger
* Adjustable Wrench
* Tubing Cutter
* Plunger
* Fire-Resistant Cloth
* Faucet aerators
* Flow bag and stopwatch
* Pipe and blanket insulation

 **Hands-on Props**

**Flow determination**: Let students use a timer and a flow bag or other receptacle with a known volume to measure the flow of a showerhead or a faucet near the classroom. Convert the results into gallons per minute. Discuss whether aerators or low-flow fixtures should be installed.

**Water heaters (electric and gas)** – In teams of no more than two, have students properly insulate the water heater and first six feet of pipe.

**Minor plumbing repairs –** Using a mock-up of a typical plumbing leak for your area (use most common piping materials), demonstrate to class how to repair or replace the leaky section. Illustrate safe and proper use of the tools required. Next, let students practice cutting and fitting sections of pipe, then test the fittings with running water.

**Low-flow fixtures and aerators –** Provide a sampling of low-flow showerheads and faucet aerators, as well as the tools required to install them. Allow students to practice installation, ideally on a working fixture so it can be tested for leakiness after. Demonstrate how to wrap a pipe wrenches jaw in a cloth to prevent damaging smooth pipe surfaces where appearance is important.

Class Overview

* Display or pass around various materials associated with plumbing-related energy reduction: aerators, pipe insulation, etc.
* Use the presentation to introduce students to the various tools and materials used in plumbing repairs. Discuss health and safety concerns, including asbestos, confined spaces, pests, and the danger of working where they may be exposed to raw sewage.
* Show students the Water Heater Info Toolkit spreadsheet tool, and explore cost-effectiveness of various replacements based on local prices and family size.