

Curriculum Map: Engines, Electricity and Plumbing 2022/23

Course: AUTO MECH Sub-topic: Uncategorized

Grade(s): 9 to 12

Course Description: A two-part course that begins with the study of the internal combustion engine, engine theory and terminology. Using hands-on approach, students fully disassemble and then re-assemble small gas engines to gain a basic understanding of the overall concept of internal combustion engine theory and operation. Students experience the safe and proper use of tools and measuring devices. The second part of this course focuses on basic residential plumbing and electrical practices. Students will construct various plumbing and wiring exercises using tools and materials currently in use by the trades today.

Course Textbooks, Workbooks, Materials Citations: Agricultural Mechanics
Delmar
2002

Unit: safety

Timeline: Week 1 to 2

Unit Description: safely use hand and power tools and personal protective equipment.

Unit Essential Questions: What should you know in order to work safely in this occupational area?

Unit Big Ideas: safely use hand and power tools and personal protective equipment.

Unit Materials: Agricultural Mechanics
Delmar
2002

Unit Assignments: Complete safety test.

STANDARDS: STANDARDS

STATE: [Pennsylvania SAS Academic Standards \(2009-2013\)](#)

[3.4.10.D2 \(Advanced\)](#) Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it.

(* standards consolidated from Topic level)

Topic: hand tools

Minutes for Topic: 44

Core Lesson Description: There are many safety hazards associated with the use of hand and power tools, and teachers and students should be trained to recognize them and understand what safety precautions should be taken to avoid them.

Safety Precautions

For hand tool use, follow these [general precautions](#) published by the Rose-Hulman Institute of Technology:

- *Hand tools shall only be used for their intended purpose.*
- *Inspect tools for damage prior to use.*
- *Hand tools shall be maintained in good condition free of damage. For example, wooden handles on tools,*

such as a hammer or an axe, shall be tight and free from splinters or cracks.

- Bent screwdrivers or screwdrivers with chipped edges shall be replaced.
- Always direct tools such as knives, saw blades, etc. away from aisle areas and away from other employees working in close proximity.
- Knives and scissors must be sharp; dull tools can cause more hazards than sharp ones.
- Cracked saw blades must be removed from service.
- Wrenches must not be used when jaws are sprung to the point that slippage occurs.
- Impact tools such as drift pins, wedges, and chisels must be kept free of mushroomed heads.
- Iron or steel hand tools may produce sparks that can be an ignition source around flammable substances. Spark-resistant tools made of non-ferrous materials should be used where flammable gases, highly volatile liquids, and other explosive substances are stored or used.
- Keep the work area and tools clean. Dirty, greasy tools and floor may cause accidents.
- Tools shall be stored in a dry secure location.
- Carry and store tools properly. All sharp tools shall be carried and stored with the sharp edge down. Do not carry sharp tools in a pocket.
- Wear the proper personal protective equipment (PPE).

[OSHA](#) provides the following general precautions for power tools use:

- Never carry a tool by the cord or hose.
- Never yank the cord or the hose to disconnect it from the receptacle.
- Keep cords and hoses away from heat, oil, and sharp edges.
- Disconnect tools when not using them, before servicing and cleaning them, and when changing accessories such as blades, bits, and cutters.
- Keep all people not involved with the work at a safe distance from the work area.
- Secure objects with clamps or a vise, freeing both hands to operate the tool.
- Avoid accidental starting. Do not hold fingers on the switch button while carrying a plugged-in tool.
- Maintain tools with care; keep them sharp and clean for best performance.
- Follow instructions in the user's manual for lubricating and changing accessories.
- Be sure to keep good footing and maintain good balance when operating power tools.
- Wear proper apparel for the task. Loose clothing, ties, or jewelry can become caught in moving parts.
- Remove all damaged portable electric tools from use and tag them: "Do Not Use."

Whether using hand or power tools, follow these five basic safety protocols to prevent accidents:

- Have regularly scheduled maintenance to keep tools in good operating condition.
- Use the correct tool for the job.
- Inspect all tools for damage prior to use. Never use a damaged tool!
- Read the manufacturers' instructions before using any tool.
- By way of safety training, learn how to assess and use the appropriate engineering controls, operating procedures, and personal protective equipment

STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

[3.4.10.D2 \(Advanced\)](#)

Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it.

Topic: power tools

Minutes for Topic: 44

Core Lesson Description:

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STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

[3.4.10.D2 \(Advanced\)](#)

Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it.

Topic: personal protective equipment

Minutes for Topic: 44

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Safety Precautions

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Whether using hand or power tools, follow these five basic safety protocols to prevent accidents:

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Unit: engines

Timeline: Week 3 to 6

Unit

Description: Learn small gas engine nomenclature and theory and application.

Unit Essential Questions:

What are small gas engine nomenclature and theory and application?

Unit Big Ideas: Learn small gas engine nomenclature and theory and application.

Unit Materials: hand tools

shop provided raw materials

Unit

Assignments:

Complete shop project

STANDARDS: STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

[3.4.10.D2 \(Advanced\)](#) Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it.

(* standards consolidated from Topic level)

Topic: engine nomenclature

Minutes for Topic: 44

Core Lesson Students will define small gas engine terms.

Description:

Students will use correct terminology in discussion of small engines.

Students will recognize small gas engine terminology and be able to effectively apply terms to usage and maintenance of the engine

Core Lesson Students will define small gas engine terms.

Student Learning**Objectives:**

Students will use correct terminology in discussion of small engines.

Students will recognize small gas engine terminology and be able to effectively apply terms to usage and maintenance of the engine

STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

[3.4.10.D2 \(Advanced\)](#) Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it.

Topic: engine theory

Minutes for Topic: 44

Core Lesson Tool and Parts Identification

Description:

1. Determine what information is needed for parts and mechanics manual usage
 2. Identify the basic engine parts and the functions of each in the operation of an engine
 3. Use the manufacturer's respective master parts manual in ordering replacement parts for an engine
 4. Use a manufacturer's manuals to solve the procedural problems specific to a particular engine
 5. Identify the parts of a magneto ignition system
 6. Identify the major components of a carburetor
 7. Identify the types of carburetors and describe the features of each of these types of carburetors
 8. Identify the basic types of governors
 9. Identify the parts of a valve and its accessories
 10. Identify the parts of the piston, rings and rod
 11. Identify the types of lubricating systems and describe how they operate
 12. Identify the parts of the camshaft and tappet mechanism
 13. Identify the types of crankshafts and parts thereof
 14. Identify the major types and applications of tools
- C. Operating Principles
1. Designate an engine as a two or four cycle
 2. Identify engine by brand name and/or manufacturer
 3. Determine what information is given on the nameplate
 4. Identify operating conditions of small gasoline engines
 5. Use horsepower terms such as indicated, friction, brake and "rated" in describing the size of an engine
 6. Define and relate the following terms:
 - a. stroke
 - b. bore
 - c. cycle
 - d. crankshaft revolution
 - e. camshaft revolution
 - f. principle events
 - g. intake
 - h. compression
 - i. power
 - j. exhaust

- k. camshaft timing
 - l. ignition timing
 - m. BTDC
 - n. TDC
 - o. BDC
 - p. power strokes per revolution of camshaft
 - q. displacement
 - r. compression ration
 - s. clearance volume
7. List the sequential order and explain the significance of the principle events in the operation of a four-stroke cycle engine
 8. Explain the relationship of the main parts of the four-stroke cycle engine to the principle events
 9. Identify a four-stroke cycle engine by visual observation
 10. Explain the difference in operation and construction of the two and four-stroke cycle engine
 11. Recognize a two-stroke cycle engine by visual observation
 12. Describe the combustion as the focal point of engine operation
 13. Describe the basic operating principles of a magneto ignition system
 14. Describe the operational principles of a carburetor
 15. Diagram the basic principle of carburetor to governor to throttle control linkage
 16. Describe the operation of each type of governor
 17. Describe the purpose and operation of valves

Core Lesson

Student Learning Objectives:

Tool and Parts Identification

1. Determine what information is needed for parts and mechanics manual usage
2. Identify the basic engine parts and the functions of each in the operation of an engine
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STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

[3.4.10.D2 \(Advanced\)](#) Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it.

Topic: engine project

Minutes for Topic: 44

Core Lesson Description:

1. Disassemble a small engine according to the procedures outlined by the manufacturer
2. Identify the wear points on a disassembled engine
3. Assemble a small engine according to the procedures outlined by the manufacturer
4. Describe the tolerance, specifications, clearance and reject size given by the manufacturer and how these terms affect engine operation
5. Identify those parts of an engine that need to be measured with a measuring device
6. Use micrometer measurements to determine if parts of a small engine are within the specifications set by the manufacturer
7. Manipulate the different micrometers and measuring devices so as to record proper measurements
8. Identify engines and machines according to model, serial, specification and type numbers when each applies
9. Use the manufacturer's specifications and torque data
10. Reface valves
11. Reface valve seats
12. Adjust valve tappet clearance
13. Install the piston rings
14. Install the piston rod assembly
15. Install the camshaft and tappets

Core Lesson Student Learning Objectives:

1. Disassemble a small engine according to the procedures outlined by the manufacturer
2. Identify the wear points on a disassembled engine
3. Assemble a small engine according to the procedures outlined by the manufacturer
4. Describe the tolerance, specifications, clearance and reject size given by the manufacturer and how these terms affect engine operation
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7. Manipulate the different micrometers and measuring devices so as to record proper measurements
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STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

[3.4.10.D2 \(Advanced\)](#) Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it.

Unit: electricity

Timeline: Week 6 to 9

Unit Description: Learn residential home electricity nomenclature and theory and application.**Unit Essential Questions:** What are residential home electricity nomenclature and theory and application?**Unit Big Ideas:** Learn residential home electricity nomenclature and theory and application.**Unit Materials:** hand tools
shop provided raw materials**Unit Assignments:** Complete assignment from textbook.
Complete associated project.**STANDARDS: STANDARDS**

STATE: Pennsylvania SAS Academic Standards (2009-2013)

[3.4.10.D2 \(Advanced\)](#) Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it.

(* standards consolidated from Topic level)

Topic: electricity nomenclature

Minutes for Topic: 44

Core Lesson Description: Through questioning and observing, students will be able to identify the use of electricity in their home, school and community.

- Students will be able to discuss the basic units of electricity (Volts, Amps, Ohms, Watts)
- Through visualizations and discussions students will be able to understand the sources of electricity.
- After completing a hands-on project students will be able to demonstrate how electricity is generated, transmitted and stored.

STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

[3.4.10.D2 \(Advanced\)](#) Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it.**Topic: electricity project**

Minutes for Topic: 44

Core Lesson Description: Students will build 5 residential electrical circuits and test them for continuity and function**Core Lesson Student Learning Objectives:** Students will build 5 residential electrical circuits and test them for continuity and function**STANDARDS**

STATE: Pennsylvania SAS Academic Standards (2009-2013)

[3.4.10.D2 \(Advanced\)](#) Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it.**Unit: plumbing**

Timeline: Week 10 to 15

Unit Description: Learn residential plumbing nomenclature and theory and application.

Unit Essential Questions: Learn residential plumbing nomenclature and theory and application.

Unit Big Ideas: Learn residential plumbing nomenclature and theory and application.

Unit Materials: hand tools
shop provided raw materials

Unit Assignments: Complete shop project.

STANDARDS: STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

3.4.10.D2 (Advanced) Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it.

(* standards consolidated from Topic level)

Topic: plumbing nomenclature

Minutes for Topic: 44

Core Lesson Description:

home plumbing system will have different types of piping materials for different uses, including freshwater supply, waste drainage, irrigation, gas pipes for appliances, and so on. Which type is used in which application will largely depend on the age of your plumbing system? An older plumbing system may be dominated by cast iron and galvanized iron, while a new home will have plastic pipes of various types used almost exclusively.

Some plastic pipes used in plumbing (such as PVC and CPVC) may also be used in the venting of high-efficiency condensing furnaces. However, this will be an overview of pipe materials for use in plumbing applications. These are the most common types of plumbing piping materials found in homes of different ages, what they are used for, and an overview of how to cut and fasten them together. Here are types of plumbing materials used in piping for waste lines, water supply pipes, and natural gas supply:

Cast iron for plumbing waste lines
PVC (PolyVinyl Chloride) for plumbing waste lines
Chromed brass for plumbing waste lines
Chromed copper for water supply lines
Galvanized iron for water supply lines
Copper (rigid and flexible) for water supply lines
CPVC (Chlorinated Poly-Vinyl Chloride) for water supply lines
PEX (Cross-linked Polyethylene) for water supply lines
Black iron for gas pipes

01

of 09

Cast Iron

Cast iron pipes on the floor

YES BRASIL / Getty Images

Appearance: Large-diameter heavy metal pipe, dull black with a rough, mottled surface.

Description: High-quality sanitary waste drain pipe that is heavy and deadens the sound of flowing wastewater very well. This pipe is strong and long-lasting but hard to cut—often requiring a special cutting tool with sharp chain cutting wheels. Repairs are often made using plastic PVC piping. Cast iron is rarely used in new construction; instead many use plastic PVC or ABS (acrylonitrile butadiene styrene) pipe.

Prevalent Use: Use for main soil stack waste lines and vent pipes.

Cutting and Fitting: Requires heavy-duty reciprocating saw or a special cutting tool called a cast-iron pipe cutter. Securing cast-iron pipes and fittings together is done using special methods, including lead and oakum in soil pipe joints, hubbed fittings or hubless couplings using pressure bands, and other methods usually unfamiliar to the homeowner.

02

of 09

PVC (Poly-Vinyl Chloride)

PVC pipe laying in a pile

danishkhan / Getty Images

Appearance: White rigid plastic.

Description: PVC is now the de-facto standard in-home waste line materials. It is a strong, chemical-resistant

rigid pipe that is heat resistant and easily cut and fit. It is often used to repair sections of broken cast-iron waste pipe as well as repairs to other drain lines.

Prevalent Use: Use for sanitary waste lines, vent pipes, and drain traps.

Cutting and Fitting: PVC pipe is easily cut with a hacksaw or tubing cutter. The sections are joined together mechanically, using plastic pressure fittings for later removal, or permanently joined using special chemical solvent.

NOTE: You may notice another plastic pipe used in your home plumbing system—a black plastic pipe. This is ABS (Acrylonitrile Butadiene Styrene) and has largely been replaced by PVC in new construction and plumbing repairs, mostly because it degrades when exposed to sunlight. If you have ABS pipe, it is cut and fitted using the same methods as for PVC.

03
of 09

Chromed Brass

Appearance: Bright, shiny chrome-finished pipe of larger diameter (more than one inch).

Description: Chromed brass tubing is often used in lieu of PVC for exposed waste line applications, such as "P" traps or other drain traps where appearance is important.

Prevalent Use: Exposed drains and traps.

Cutting and Fitting: Easily cut with a hacksaw, and joined with slip fittings.

04
of 09

Chromed Copper

Appearance: Bright, shiny chrome finished pipe of smaller diameter (3/8 inch or less).

Description: Chromed copper pipe is often used where the appearance of exposed water supply lines is important.

Prevalent Use: Exposed water supply lines, such as supply tubing for toilets or pedestal sinks.

Cutting and Fitting: Easily cut with a tubing cutter or hacksaw, and joined with chromed brass compression fittings.

05
of 09

Galvanized Iron

Galvanized pipe

Amazon.com

Appearance: Dull silver-gray rigid metal pipe.

Description: Galvanized iron pipe was once a popular method of plumbing water supply lines in the home, but it gradually fails due to corrosion and rust. For this reason, it is no longer commonly used and has been largely replaced with copper pipe or PEX plastic pipe. Galvanized iron pipe is difficult to cut and join and not easily fabricated on site by the homeowner. Repairs are usually done by replacing the pipes with copper or PEX.

Prevalent Use: Water supply lines and drain lines in older homes.

Cutting and Fitting: Can be cut using a reciprocating saw or hacksaw. The pipe is joined by using threaded galvanized iron fittings.

06
of 09

Copper (Rigid and Flexible)

Copper pipe leading to a radiator

nsj-images / Getty Images

Appearance: Dull, copper-colored metal pipe.

Description: Copper pipe comes in two types: rigid and flexible. The rigid type comes in several wall thicknesses: K, L, and M. Type M is normally used for water supply pipes. Copper has proven itself over the decades to be corrosion resistant and very reliable. Copper is a soft metal and can be easily cut and fabricated. It is also prone to damage, may develop pinholes over time, and can rupture from frozen water in pipes.

Rising costs for copper in recent years have caused PEX and CPVC to be used more frequently. Copper pipe costs as much as three times as much as PEX.

Prevalent Use: Rigid copper pipes are used for longer runs of water supply, and in some cases as waste lines in the home. Flexible copper is used in short runs, for water supply, and for the water supply tubing for refrigerators and dishwashers. Copper may also be used for gas piping.

Cutting and Fitting: Copper pipe is easily cut with a tubing cutter or hacksaw. Sections are joined together with soldered copper connectors or copper compression fittings. The flexible copper pipe may also be terminated by flaring its end and using brass flare fittings.

07

of 09

CPVC (Chlorinated Poly Vinyl Chloride)

CPVC pipe laying in a pile

danishkhan / Getty Images

Appearance: Dull white or cream-colored plastic.

Description: CPVC is an inexpensive rigid plastic that is designed to withstand high pressure and temperature.

Prevalent Use: CPVC is used for hot and cold water supply piping.

Cutting and Fitting: The pipe is easily cut with a tubing cutter or hacksaw. CPVC is joined permanently together using plastic fittings and solvent glue, or with grip fittings where the pipes may need to be disassembled in the future.

**Core Lesson
Student Learning
Objectives:**

home plumbing system will have different types of piping materials for different uses, including freshwater supply, waste drainage, irrigation, gas pipes for appliances, and so on. Which type is used in which application will largely depend on the age of your plumbing system? An older plumbing system may be dominated by cast iron and galvanized iron, while a new home will have plastic pipes of various types used almost exclusively.

Some plastic pipes used in plumbing (such as PVC and CPVC) may also be used in the venting of high-efficiency condensing furnaces. However, this will be an overview of pipe materials for use in plumbing applications. These are the most common types of plumbing piping materials found in homes of different ages, what they are used for, and an overview of how to cut and fasten them together. Here are types of plumbing materials used in piping for waste lines, water supply pipes, and natural gas supply:

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CPVC (Chlorinated Poly-Vinyl Chloride) for water supply lines

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Black iron for gas pipes

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of 09

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Cast iron pipes on the floor

YES BRASIL / Getty Images

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Prevalent Use: Use for main soil stack waste lines and vent pipes.

Cutting and Fitting: Requires heavy-duty reciprocating saw or a special cutting tool called a cast-iron pipe cutter. Securing cast-iron pipes and fittings together is done using special methods, including lead and oakum in soil pipe joints, hubbed fittings or hubless couplings using pressure bands, and other methods usually unfamiliar to the homeowner.

02

of 09

PVC (Poly-Vinyl Chloride)

PVC pipe laying in a pile

danishkhan / Getty Images

Appearance: White rigid plastic.

Description: PVC is now the de-facto standard in-home waste line materials. It is a strong, chemical-resistant rigid pipe that is heat resistant and easily cut and fit. It is often used to repair sections of broken cast-iron waste pipe as well as repairs to other drain lines.

Prevalent Use: Use for sanitary waste lines, vent pipes, and drain traps.

Cutting and Fitting: PVC pipe is easily cut with a hacksaw or tubing cutter. The sections are joined together mechanically, using plastic pressure fittings for later removal, or permanently joined using special chemical

solvent.

NOTE: You may notice another plastic pipe used in your home plumbing system—a black plastic pipe. This is ABS (Acrylonitrile Butadiene Styrene) and has largely been replaced by PVC in new construction and plumbing repairs, mostly because it degrades when exposed to sunlight. If you have ABS pipe, it is cut and fitted using the same methods as for PVC.

03
of 09

Chromed Brass

Appearance: Bright, shiny chrome-finished pipe of larger diameter (more than one inch).

Description: Chromed brass tubing is often used in lieu of PVC for exposed waste line applications, such as "P" traps or other drain traps where appearance is important.

Prevalent Use: Exposed drains and traps.

Cutting and Fitting: Easily cut with a hacksaw, and joined with slip fittings.

04
of 09

Chromed Copper

Appearance: Bright, shiny chrome finished pipe of smaller diameter (3/8 inch or less).

Description: Chromed copper pipe is often used where the appearance of exposed water supply lines is important.

Prevalent Use: Exposed water supply lines, such as supply tubing for toilets or pedestal sinks.

Cutting and Fitting: Easily cut with a tubing cutter or hacksaw, and joined with chromed brass compression fittings.

05
of 09

Galvanized Iron

Galvanized pipe

Amazon.com

Appearance: Dull silver-gray rigid metal pipe.

Description: Galvanized iron pipe was once a popular method of plumbing water supply lines in the home, but it gradually fails due to corrosion and rust. For this reason, it is no longer commonly used and has been largely replaced with copper pipe or PEX plastic pipe. Galvanized iron pipe is difficult to cut and join and not easily fabricated on site by the homeowner. Repairs are usually done by replacing the pipes with copper or PEX.

Prevalent Use: Water supply lines and drain lines in older homes.

Cutting and Fitting: Can be cut using a reciprocating saw or hacksaw. The pipe is joined by using threaded galvanized iron fittings.

06
of 09

Copper (Rigid and Flexible)

Copper pipe leading to a radiator

nsj-images / Getty Images

Appearance: Dull, copper-colored metal pipe.

Description: Copper pipe comes in two types: rigid and flexible. The rigid type comes in several wall thicknesses: K, L, and M. Type M is normally used for water supply pipes. Copper has proven itself over the decades to be corrosion resistant and very reliable. Copper is a soft metal and can be easily cut and fabricated. It is also prone to damage, may develop pinholes over time, and can rupture from frozen water in pipes.

Rising costs for copper in recent years have caused PEX and CPVC to be used more frequently. Copper pipe costs as much as three times as much as PEX.

Prevalent Use: Rigid copper pipes are used for longer runs of water supply, and in some cases as waste lines in the home. Flexible copper is used in short runs, for water supply, and for the water supply tubing for refrigerators and dishwashers. Copper may also be used for gas piping.

Cutting and Fitting: Copper pipe is easily cut with a tubing cutter or hacksaw. Sections are joined together with soldered copper connectors or copper compression fittings. The flexible copper pipe may also be terminated by flaring its end and using brass flare fittings.

07
of 09

CPVC (Chlorinated Poly Vinyl Chloride)
CPVC pipe laying in a pile
danishkhan / Getty Images
Appearance: Dull white or cream-colored plastic.

Description: CPVC is an inexpensive rigid plastic that is designed to withstand high pressure and temperature.

Prevalent Use: CPVC is used for hot and cold water supply piping.

Cutting and Fitting: The pipe is easily cut with a tubing cutter or hacksaw. CPVC is joined permanently together using plastic fittings and solvent glue, or with grip fittings where the pipes may need to be disassembled in the future.

STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

[3.4.10.D2 \(Advanced\)](#) Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it.

Topic: plumbing project

Minutes for Topic: 44

Core Lesson

Description:

home plumbing system will have different types of piping materials for different uses, including freshwater supply, waste drainage, irrigation, gas pipes for appliances, and so on. Which type is used in which application will largely depend on the age of your plumbing system? An older plumbing system may be dominated by cast iron and galvanized iron, while a new home will have plastic pipes of various types used almost exclusively.

Some plastic pipes used in plumbing (such as PVC and CPVC) may also be used in the venting of high-efficiency condensing furnaces. However, this will be an overview of pipe materials for use in plumbing applications. These are the most common types of plumbing piping materials found in homes of different ages, what they are used for, and an overview of how to cut and fasten them together. Here are types of plumbing materials used in piping for waste lines, water supply pipes, and natural gas supply:

Cast iron for plumbing waste lines
PVC (PolyVinyl Chloride) for plumbing waste lines
Chromed brass for plumbing waste lines
Chromed copper for water supply lines
Galvanized iron for water supply lines
Copper (rigid and flexible) for water supply lines
CPVC (Chlorinated Poly-Vinyl Chloride) for water supply lines
PEX (Cross-linked Polyethylene) for water supply lines
Black iron for gas pipes

01

of 09

Cast Iron

Cast iron pipes on the floor

YES BRASIL / Getty Images

Appearance: Large-diameter heavy metal pipe, dull black with a rough, mottled surface.

Description: High-quality sanitary waste drain pipe that is heavy and deadens the sound of flowing wastewater very well. This pipe is strong and long-lasting but hard to cut—often requiring a special cutting tool with sharp chain cutting wheels. Repairs are often made using plastic PVC piping. Cast iron is rarely used in new construction; instead many use plastic PVC or ABS (acrylonitrile butadiene styrene) pipe.

Prevalent Use: Use for main soil stack waste lines and vent pipes.

Cutting and Fitting: Requires heavy-duty reciprocating saw or a special cutting tool called a cast-iron pipe cutter. Securing cast-iron pipes and fittings together is done using special methods, including lead and oakum in soil pipe joints, hubbed fittings or hubless couplings using pressure bands, and other methods usually unfamiliar to the homeowner.

02

of 09

PVC (Poly-Vinyl Chloride)

PVC pipe laying in a pile

danishkhan / Getty Images

Appearance: White rigid plastic.

Description: PVC is now the de-facto standard in-home waste line materials. It is a strong, chemical-resistant rigid pipe that is heat resistant and easily cut and fit. It is often used to repair sections of broken cast-iron waste pipe as well as repairs to other drain lines.

Prevalent Use: Use for sanitary waste lines, vent pipes, and drain traps.

Cutting and Fitting: PVC pipe is easily cut with a hacksaw or tubing cutter. The sections are joined together mechanically, using plastic pressure fittings for later removal, or permanently joined using special chemical solvent.

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nsj-images / Getty Images

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