

Tools of the Trade



Inside the Mason's Toolbox

SHOPWARE

Instructor's Guide

Introduction

This Teacher's Guide provides information to help you get the most out of *Inside the Mason's Toolbox*, part of the *Tools of the Trade* series. The contents of this guide will allow you to prepare your students before they use the program, assist them as they navigate through the program, and present follow-up activities to reinforce the program's key learning points.

Tools of the Trade is a 6-part series of programs that present inventories of the most common and most basic tools used in specific trades. Each program opens the trade's "toolbox" so students can delve into its basic tools and materials, including their purpose and proper usage. Students will view brief demonstrations of rudimentary tasks with the tools, and gain an understanding of safety precautions, code concerns, and industry tips, if applicable.

Inside the Mason's Toolbox is a 25-minute video targeted to students (vocational students, in particular) in grades 9-12. Its content is appropriate to such curriculum areas as Technology Education, Trade, and Industrial Education. The information presented in the *Tools of the Trade* series could also be presented in vocational/technical schools or "Do it Yourself" adult education courses.

The *Tools of the Trade* series consists of the following titles:

- *Inside the Plumber's Toolbox*
- *Inside the Carpenter's Toolbox*
- *Inside the Mason's Toolbox*
- *Inside the Welder's Toolbox*
- *Inside the Automotive Mechanic's Toolbox*
- *Inside the Electrician's Toolbox*

Learning Objectives

After watching this program, students will be able to:

- Identify and understand basic safety standards and site preparation.
- Demonstrate proper use and maintenance of the basic brick/masonry tools, materials, and equipment.
- Identify and understand basic use of brick and masonry hand and power tools.
- Recognize and explore career opportunities in the masonry industry.

Educational Standards

This program correlates with the following standards:

- The competency standards for Core Introductory Craft Skills from the National Center for Construction Education & Research (NCCER)
- The National Occupational Competency Testing Institute (NOCTI) / SkillsUSA Examination Standards
- The Trade and Industrial Education Course Standards for the State of Tennessee
- The standards of Essential Knowledge and Skills for Trade and Skills for Career Orientation, High School, for the State of Texas.
- The content has been aligned with the Manufacturing, Construction, Science Research and Technology Career Cluster, the Construction Career Cluster, and the Florida Department of Education's Masonry and Agricultural Mechanics Clusters.

- Standard 2.0 Career Cluster: Architecture and Construction Careers in designing, planning, managing, building and maintaining the built environment. (Competency Standards for Core Curriculum and Carpentry from the National Center for Construction Education & Research.)
- The student analyzes the effect of personal interest and aptitudes upon educational and career planning, and knows how to locate, analyze, and apply career information. (Texas State Standards: Essential Knowledge and Skills for Trade and Skills for Career Orientation, High School.)
- The student can identify the responsibilities and personal characteristics of a professional craftsman, explain the role that safety plays in the construction crafts, describe what job-site safety means, explain the appropriate safety precautions around common job-site hazards, demonstrate the use and care of appropriate personal protective equipment, and follow safe procedures for lifting heavy objects. (Competency Standards for Construction Craft Laborer (Basic Safety) from the National Center for Construction Education & Research)
- The student can recognize and identify some of the basic hand tools used in the construction trade, use these tools safely, and describe the basic procedures for taking care of these tools. The student can also identify commonly used power tools of the construction trade, use power tools safely, and explain how to maintain power tools properly. (Competency Standards for Construction Craft Laborer (Hand Tools and Power Tools) from the National Center for Construction Education & Research.)
- The student can describe the uses of masonry; describe modern masonry materials and methods; describe the skills, attitudes, and abilities needed to work as a mason; describe safety precautions and general housekeeping practices that should be followed at a typical work site; describe the procedures for safely handling and maintaining masonry tools; describe the most common types of masonry units; describe and demonstrate setting up a wall; lay a dry bond; and spread and furrow a bed joint and butter masonry units. (Competency Standards for Construction Craft Laborer (Introduction and Safety) from the National Center for Construction Education & Research.)
- The student can identify and name the tools used in performing masonry work; identify and name the equipment used in performing masonry work; describe how each tool is used; describe how the equipment is used; and associate trade terms with the appropriate tools and equipment. (Competency Standards for Construction Craft Laborer (Masonry Tools and Equipment) from the National Center for Construction Education & Research.)
- The student can name and describe the primary ingredients in mortar and their properties; identify the various types of mortar used in masonry work; describe the common admixtures and their uses; properly set up the mortar mixing area; properly mix mortar by hand; and properly mix mortar with a mechanical mixer. (Competency Standards for Construction Craft Laborer (Mortar) from the National Center for Construction Education & Research.)
- The student can name and describe and demonstrate setting up a wall; describe the different types of masonry bonds; cut brick and block accurately; and lay masonry units in a true course. (Competency Standards for Construction Craft Laborer (Installation Techniques) from the National Center for Construction Education & Research.)
- Standard 25.0: The student mixes and pours concrete and uses masonry materials. The student is able to calculate concrete and other materials for a masonry project; prepare forms; mix and pour concrete; and lay concrete blocks and/or bricks. (Agricultural Mechanics Cluster for the Florida Department of Education.)

- Standard 01.0: The student follows safety practices. The student is able to identify and follow general safety rules, and follow safety practices when using tools and equipment. (Masonry Cluster for the Florida Department of Education.)
- Standard 03.0: The student identifies and uses hand tools. The student is able to: identify, care for, and use basic hand tools; select hand tools for specific jobs; identify power tools; read English rules to the 1/16"; and read brick-spacing rules and brick modular rules. (Masonry Cluster for the Florida Department of Education.)
- Standard 04.0: The student selects and mixes mortars and concrete. The student is able to: identify types of mortars; identify the ingredients and properties of mortars; identify the properties and characteristics of concrete; identify the types and purposes of grouts; store and place materials; select mortars and concrete; mix mortars by hand and by machine; mix concrete by hand and by machine; and clean up tools, equipment, and the work site. (Masonry Cluster for the Florida Department of Education.)
- Standard 07.0: The student lays brick and/or block to the line. The student is able to: spread mortar for brick and/or block; butter head joints; set up masonry materials; pull a line; cut bricks and/or blocks with a hammer, a brick set, and a trowel; temper mortar; maintain proper spacing of head and bed joints; point and tool joints in brick and/or block walls; and lay brick and/or block to the line. (Masonry Cluster for the Florida Department of Education.)
- Standard 09.0: The student identifies the various methods of masonry practices. The student is able to: identify the methods of basic building layouts; identify the methods of digging and pouring footings; identify the methods of forming, grading, and pouring concrete slabs; identify measuring tools; and identify power equipment. (Masonry Cluster for the Florida Department of Education.)
- Standard 22.0: The student operates and maintains power equipment. The student is able to: follow safety practices when using and maintaining power equipment; use masonry saw with an abrasive blade to cut masonry units; use masonry saw with a diamond blade to cut masonry units; and set up, operate, and maintain power tools and equipment. (Masonry Cluster for the Florida Department of Education.)

Program Summary

Given the wide range of trades in the world today, the *Tools of the Trade* series is a welcome addition to the Shopware brand. Its overview and demonstration of the basic tools used in each trade help lay the foundation of understanding for the trades, and pique student interest in developing "do it yourself" practical knowledge that can also lead to masonry as a possible career choice.

The third title in the series, *Inside the Mason's Toolbox*, provides an introductory level overview of masonry and related concepts, emphasizing the basic tools used for the trade. The program highlights the technical knowledge of materials, basic safety standards, and proper use of basic hand and power masonry tools. It also touches upon education and career opportunities for masons.

Main Topics

Topic 1: Introduction

The program's host, Alan Pratt, introduces the viewer to the masonry trade and reviews how to be properly outfitted with the right personal protective equipment while on the job.

Topic 2: Masonry Materials

In this section, building materials (brick, block, stone, and concrete) and the mortar mixes and fasteners used to hold them together are discussed.

Topic 3: Masonry Tools

This comprehensive section allows the viewer to see a wide range of masonry tools in action. Demonstrations include building a brick wall and cutting brick; laying and cutting concrete block; moving, cutting, and shaping stone; and casting concrete.

Topic 4: Career Outlook

Alan offers some closing remarks on the program, and points out additional resources for learning more about careers in masonry.

Fast Facts

- Brick is a building material that dates as far back as 5,000 years ago. Babylonians hand-fashioned bricks out of clay from the riverbanks because there were no other suitable materials. Ancient Romans manufactured great numbers of fired bricks to use as hidden structural material beneath stone or marble; the Byzantines, in contrast, exposed the bricks for decorative purposes. Brickwork has been used since the Middle Ages in a wide array of architectural styles. In the 19th century, new mechanical brick-making processes replaced the archaic methods to keep up with the demand for mass-produced building materials.
- The largest structure ever made from adobe bricks was the Bam Citadel, in Iran. Tragically, it took only 30 seconds to level 2,000 years of history, when it was destroyed by a massive earthquake in 2003.
- The masonry arch is a perfect example of form following function. Not only is it easy to construct, but it can span areas by supporting loads with little compression. Its flexible and basic design can be built into a variety of elegant shapes, with perfect balance, proportion, and scale in whatever design is created.
- The Great Wall of China, built over 2,000 years ago, is one of the largest building construction projects ever completed. Composed of masonry, rocks, and packed earth, its thickness ranges from about 15-30 feet at the base tapering up to about 12 feet at the top, and up to 25 feet in height. Since being enlarged and renovated during the Ming Dynasty (1368-1644), the Great Wall is now an unbelievable 4,000 miles in length. Another feat of early masonry is the work of the Incas in Peru, whose mortarless construction was so skillful that a piece of paper could not be inserted between the stones.
- An innovative, self-ventilating, mortarless brick veneer called the Novabrik is a new material that claims to reduce the cost of labor and materials by as much as 20%, and provide quick and easy installation. It overlaps like shingles to eliminate water penetration, letting the wall breathe and providing drainage at the same time. In addition, unlike traditional brick, it won't dent, chip, or fade.
- It is predicted that in the next three to five years, innovations in masonry tools will move towards providing safer, more ergonomically correct, and more versatile tools. Examples include the addition of anti-vibration technology to new power tools for better comfort, the improvement of dust and pollutants collection at the point of contact, and the increased production of multi-function tools, allowing masons to carry and switch between fewer tools while they work to complete a variety of tasks.

- Demand for qualified masons continues to increase. The U.S. Department of Labor estimates that from now until 2016, 23,000 new jobs will be created in the industry, and more than 15% of existing jobs will need to be refilled. In addition, by 2012, the number of workers age 55 and older will soar to a remarkable 50%. This means there will be invaluable opportunities for obtaining new apprenticeships with experienced masons before they leave the workforce.
- "Slipforming" is an old-style method of masonry, in which short "forms" are placed on both sides of the wall to act as a guide for stone work. The forms are filled with stone and concrete, and then "slipped" up for the next level.
- In 2005, 17.9% of all new single-family detached homes were made of concrete, in the form of masonry work, insulating concrete forms, removable concrete forms, precast panels, or autoclaved aerated concrete (AAC).
- Masons are at risk for developing low-back disorders due to many factors, including bending forward more than 1000 times per shift, moving an estimated 200 blocks or 600 bricks per day, wearing gloves when moving blocks (which reduces grip strength), and positioning a mortarboard at or below knee level (which forces the mason to lean forward). To reduce fatigue and injuries, it is recommended that masons perform pre-job stretches and exercises, and take scheduled breaks.

Vocabulary Terms

adobe brick: A traditional southwest building material and one of the world's oldest, made of sun-dried, unburned clay and straw.

aggregate: Granular material, consisting of normal-weight or lightweight particles used with a cementing medium, to form concrete masonry, mortar, or grout.

air-purifying respirator: Self-contained breathing apparatus that complies with OSHA requirements.

anchor: Metal or strap usually made of brass, stainless steel, or galvanized steel, used to tie a wall to another structure.

arch: A section of masonry work that spans an opening and supports not only its own weight, but also the weight of the masonry work above it.

Autoclaved Aerated Concrete (AAC) block: Manufactured building block, made of all-natural raw materials, that has one-third the density and weight of traditional concrete block.

base (footing): The concrete foundation that supports a building and transmits the load into the soil.

batter boards: Horizontal boards attached level to stakes, used to mark out the boundary of a construction and establish the levels and building line.

batter gauge: An often homemade tool created out of 2x4 or 2x6, fastened to a level with duct tape, used to ensure proper slope of a stone wall.

bed: The bottom side of a brick or block as it has been laid in the wall.

bed joints: Horizontal mortar bed on which a masonry unit has been laid.

blueprint: A type of paper-based reproduction, usually of a technical drawing, documenting an architectural or engineering design.

bond: (1) Pattern of laid masonry units. (2) Adhesion between mortar and masonry units; tying together parts of two or more wythes of masonry walls by overlapping masonry units.

brick: (1) A molded rectangular block of clay baked by the sun or in a kiln until hard and used as a building and paving material. Bricks are available as solid brick, or for added security in a mortar joint, with frogs or cores. (2) A tool, made of silicone carbide, used to apply textures or a brushed finish to cast concrete.

bricklayer's brush: A tool used to clean the bricks and dried joints when laying bricks.

brickset: A tool used for cutting brick, which is beveled on one side and straight on the other.

brick tongs: A tool that allows a number of bricks to be picked up at one time.

bricklayer's rule: A tool used to check the height, alignment, and plumb of the brickwork.

bricklayer's trowel: A tool used to cut, spread, and handle mortar when laying brick. It has a flat, triangular steel blade in an offset handle used to pick up and spread mortar. The narrow end of the blade is called the "point" and the wide end is called the "heel."

brooms: Tools used to apply textures or brushed finishes to cast concrete.

bull floats: Tools used to "float down" or level cast concrete.

buttering: The process of placing mortar on a masonry unit with a trowel.

cap: The top row of a brick wall.

carpenter's square: A tool shaped like an "L" that is made of flat steel or aluminum, used to measure, mark, and check right angles.

cast (poured) concrete: Building material composed of cement, sand, stone or gravel aggregate, and water.

caulk: Sealing material used around doors, windows, and other cracks, which is placed with a caulking gun.

cement block line stretcher: A line used to hold the construction line on block.

cement mixer: Equipment used to mix concrete or mortar.

chalk line: A taut string or cord dusted with chalk that is "snapped" to mark alignment levels.

circular saw: A portable, heavy-duty cutting tool that works well on a variety of projects and is ideal for cutting, cleaning, and slotting of all types of masonry.

closer: The last brick added to a wall to complete it.

concrete: A hard, strong construction material consisting of sand, conglomerate gravel, pebbles, broken stone, or slag in a mortar or cement matrix.

concrete block: A hollow concrete "brick" often 8" x 8" x 16" in size used as a building material.

concrete trowel: A tool used to create a smooth finish on cast concrete.

control joint: A vertical joint made in the wall to allow for shrinkage movement. It is used to prevent random cracking of the wall caused by contraction.

course: A continuous row of building material. An even course of stretchers overlaps the alternate odd course in a brick wall. The second thickness of a wall is referred to as the backup course.

cupping: The process of cutting off a wedge of mortar, shaping it to fit the trowel blade, and then scooping it with the wrist and shaking off any excess.

darbies: Tools used to level the concrete after cast concrete is screeded.

dowel: A cylindrical piece of steel, either smooth or threaded, used to hold stone in place. Dowels can be set in sealant, mortar, or epoxy.

dust mask: A safety item used to prevent inhalation of dry Portland cement or any dusty material.

earmuffs: A safety item used to protect the user from hearing loss.

edgers: Tools used to seal and round over the edges of cast concrete so that they don't chip.

expansion joint: A vertical or horizontal joint used to separate masonry into segments to control cracking.

face: The exposed surface of a wall. Also the surface of a masonry unit to be exposed in finished work.

face shield: A safety item used to protect the mason's face from grit or debris.

fasteners: A mechanical way of making structural attachments and connections in masonry. Types include construction, concrete, and high-strength fasteners, as well as masonry nails, anchors, and bolts.

float: A tool used to level cast concrete.

furrowing: A small indentation cut into the mortar bed by a trowel to prepare the mortar bed for a brick.

grades: Brick classifications sorted by the kind of weathering the brick is meant to sustain, or in the case of pavers, by how much traffic load they can bear. Grades are also used to create a scale to which stone can be sold and installed.

groover: A tool that creates a control joint in concrete, so that if the concrete cracks, it will do so along the groove placed by the tool.

grout: A substance consisting of Portland cement, lime, and aggregate, placed into spaces within a masonry wall.

Grout Grunt: A lightweight tool that allows quick transfer of grout to a cement block wall.

hard hat: A safety item used to protect the mason's head from falling hazards; it also allows other safety equipment to be attached to it.

head joint: The vertical mortar joint between ends of masonry units. Often called a cross joint.

header: A masonry unit which overlaps two or more adjacent wythes of masonry to bond them together.

inside and outside corner tools: Tools used to smooth the corners on cast concrete.

jointer: A striking tool used to shape mortar and make it more compact and watertight.

joint: The place where two masonry units meet, often bound together by mortar, and shaped by jointers and rakers. Joint types include concave, vee, flush, raked, extruded, beaded, struck, and weathered.

journeyman: Craftsman or tradesman who has completed and passed an apprenticeship in a trade.

kiln: Oven for firing brick or tile.

knee pads/kneeler board: Safety equipment used to help prevent knee damage when kneeling for extended periods. It is also used to protect set, uncured concrete that has been laid.

level: A tool for determining, or adjusting a surface to an even horizontal plane.

mason's hammer (brick hammer): A tool used to tap bricks into place in a brick wall.

mason's line: String stretched on a brick wall to maintain an even level. It is attached to mason's line blocks, which are wood or plastic blocks with grooves on the inner edges to hold the line for building the wall.

masonry: That which is built by a mason; anything constructed of the materials used by masons, such as stone, brick, concrete, tiles, etc.

masonry cement: Pre-mixed and bagged mortar, used in masonry.

masonry saws: Diamond-blade saws that are really specialized grinders used to cut through masonry.

Material Safety Data Sheets: Documents describing the known hazards associated with a material.

mortar: A plastic mixture of cementitious materials, fine aggregate, and water, used in masonry to fill the gaps between construction units.

mortar hoe: A tool used when mixing mortar. It has two holes in the blade so the mortar can pass through it.

mortar joint reinforcements: Materials used to help tie, bond or reinforce masonry projects. Examples include rebar and cement grout.

mortarboard ("hawk"): A board, usually square, used by masons to hold mortar.

nominal size: The actual size of a building material plus the mortar joint. For example, block is made to be laid with $\frac{3}{8}$ -inch mortar head joints and bed joints, so the actual size of standard block is $7\frac{5}{8}$, but its nominal size is 8 inches.

parging: The process of applying a coat of cement mortar to masonry construction, especially on masonry walls, to seal and weatherproof it. Also, the cement mortar coat itself.

plastering trowel: A tool used to spread and smooth plaster.

plate compactor: Equipment used to compact pavers into the bedding sand layer in order to promote interlock among the individual units.

plumb: A vertical element that is perfectly perpendicular to a level surface.

plumb bob: A tool used to check if something is perfectly perpendicular.

pointing trowel: A smaller trowel used for detail work and to restrike bed joints in brickwork.

Portland cement / lime: A mortar that combines Portland cement, hydrated lime, sand, and water. It is a grade of cement, not a brand.

power drill: An invaluable power tool used by stone masons to bore through stone.

rakers: Striking tools used to shape mortar into joints and make them more compact and watertight.

rakes: Tools used to work cast concrete into the corners.

rebar: A horizontal or vertical bar used to reinforce a masonry structure.

reciprocal saw: A saw used in masonry to cut concrete block.

reinforcement wire: Wire used by masons to prevent concrete from cracking and moisture from being absorbed too quickly into the dry earth below it.

retemper: The process of sprinkling a little water and then remixing to ensure mortar has a consistent and workable consistency.

rowlocks: Header bricks laid on edge.

scarifier: To create the maximum seal in the waterproofing when parging a block wall, this tool is used after the first coat to help the second coat bond to it.

S-jointer: A shorter jointer used for head joints.

screeding: The process of leveling and smoothing the top layer of a material that is poured, such as concrete, so the material is the same height as the forms, or guides, that surround it.

sighting down: The process of looking down a wall on the diagonal when building a wall to make sure it's true.

sledrunner jointer: A tool used to create smooth, even joints in a block wall.

slide rule: A mechanical analog computer, consisting of at least two finely divided scales (rules), most often a fixed outer pair and a movable inner one, with a sliding window called the cursor. It is used primarily for multiplication and division, and also for "scientific" functions such as roots, logs, and trig, but does not generally perform addition or subtraction.

square shovels: Tools used to work cast concrete into the corners.

stone: A building material available as uncut rubble, or more expensive cut ashlar.

stone chisels: Tools, usually made of carbide in order to remain sharp, used for shaping hard stone.

stone hammers: Tools available in different weights and shapes used to strike a chisel when shaping hard stone.

stone splitting wedges: Small wedges hammered into a stone to assist in splitting stone.

story pole: A tool used to check the height, alignment, and plumb of the brickwork.

stretcher: A brick or stone laid with its length parallel to the face of the wall.

strikeoff: A tool used for screeding a concrete surface by striking off the excess. It's built to the required depth for each job with either straight 2-by lumber for the handle and 1-by for the blade, or a straight piece of wood only for some jobs.

striking (tooling): The process of finishing mortar joints.

striking hammer: A tool used to strike a chisel when shaping hard stone.

tags: Excess mortar left behind after striking.

tamper: A tool used after excavating to pack down the base, prior to building a wall.

tape measures: Also called push-pull rules, these are measuring tools used to measure distances.

trowel: A flat-bladed hand tool for leveling, spreading, or shaping substances such as cement or mortar. It is available in various patterns, widths, lengths, and sets (the angle of the handle in relation to the blade).

vibrator: A power tool that removes air pockets from the concrete while it is being poured.

wise: A tool that works as a mechanical screw apparatus to hold or clamp work pieces. It is used in masonry to secure brick.

wall ties: Galvanized strips of metal cut 1 inch wide in varying lengths, used to help tie, bond, and reinforce a wall. An example is a Z-tie.

wythe: Vertical wall or tier of masonry units that is one unit thick.

Pre-Program Discussion Questions

1. Think about and describe some examples of masonry you see around you in your home or community.
2. What kind of safety equipment do you think should be worn when performing masonry work?
3. Can anyone explain what a "brick and mortar" business is? Why did that expression come into being? Is it used in the same context now? If not, why do you think its usage has changed?
4. Name some building materials. Which do you think is the strongest? Which is the hardest to work with, and why?

5. In what ways are building materials bonded or fastened together? What difference do you think it makes to various types of masonry projects?

Post-Program Discussion Questions

1. Name four main building materials used in masonry. What are the advantages and disadvantages of each?
2. What is the difference between "actual size" and "nominal size"? What is the difference between a head joint and a bed joint?
3. What are the two basic kinds of mortar mixes, and of what are they composed? What tools are used when mixing mortar? How do you temper mortar?
4. Review and describe the steps involved in making a brick wall, remembering to mention the various tools used throughout the process. Do the same thing for cast concrete construction.
5. What tools can be used to cut brick? How about concrete block? What can you use to cut and shape stone?

Individual Student Projects

- Research brick types and bond patterns for brick walls, and select your preference of each. Then, write a paper that takes the reader step-by-step through the process of building a wall composed of your selections. Make sure to include supporting diagrams that point out and label the details of the wall's construction, including materials, wall components, and tools used.
- Select an example of a stonework project either in your home, in your school, en route between the two, or in a nearby town. Take pictures of the project, and then create a short presentation that explains what the project entails, and how you think it was accomplished, including what the stonemasons did and what tools and materials they used. Does it demonstrate excellent or poor workmanship? If the latter, how do you think it could have been improved?
- Create a multimedia presentation that details examples of either brick paving or cast concrete in your community. For brick, what brick types and brick grades do you think were used, and why? For cast concrete, which textures were created and which tools do you think were used to complete the task?

Group Activities

- Practice mixing mortar and adjusting the consistency. In three wheelbarrows or mortarboxes:
 - Add too much sand.
 - Add too much lime.
 - Add too much water.

Then, divide the class into three groups and practice adjusting the mortar until it is the correct consistency. Discuss your adjustments.

- Discuss various methods of cutting brick and block, emphasizing how to do so safely. Then practice the various methods:
 - Cut a brick using a brickset and a mason's hammer.
 - Cut a brick using a circular saw.
 - Cut a brick using a masonry saw.
 - Cut a concrete block using a brickset and hammer.
 - Cut a concrete block using a circular saw.
 - Cut a concrete block using a reciprocal saw.

Afterwards, as a class, discuss the advantages and disadvantages of each masonry tool for the task.

- Practice applying different finishes to cast concrete using a wide array of finishing tools. Take pictures of the end results; then create a large display or set of posters depicting both the textures and the tools used.

Internet Activities

- Using the Internet, search for a project in which an old structure is to be refinished or redone with masonry. Compare the masonry tasks involved in each. Which is easier/faster to accomplish, and why?
- What innovative masonry tools are new to the marketplace? What benefits do they provide? Describe a tool that you think could be invented or improved.
- Besides becoming a mason, what careers are available that involve masonry? Write a paper detailing the various job descriptions and career paths.

Assessment Questions

- Q1:** Standard U.S. bricks are 4" (width) x 3" (height) x 8" (length) nominal size. If brick is to be laid with $\frac{1}{2}$ -inch head joints, what is the actual size of the brick?
- 4" x 3" x 8". The mortar joint makes no difference.
 - $3\frac{1}{2}$ " x $2\frac{1}{2}$ " x $7\frac{1}{2}$ "
 - $3\frac{1}{2}$ " x $2\frac{1}{2}$ " x 8"
 - $4\frac{1}{2}$ " x $3\frac{1}{2}$ " x $8\frac{1}{2}$ "
 - $4\frac{1}{2}$ " x $3\frac{1}{2}$ " x 8"
- Q2:** Choose either "lime" or "sand": When mixing mortar, _____ is what makes the mortar more plastic and manageable, while _____ gives volume to the mortar.
- Q3:** What is the importance of watering down bricks, and what should you use to do it?
- Q4:** For precise cutting, angles, or extra-hard bricks, which of the following is the best statement about the appropriate tool(s) to use?
- Cut with a brickset and hammer.
 - Cut with a circular saw with a masonry blade.
 - Cut with a masonry saw with a masonry blade.
 - Cut with a hand saw.
- Q5:** True or False: When jointing a block wall, use a sledrunner jointer for smooth, even joints.
- Q6:** What are some advantages of using concrete block as a building material? (Select all that apply.)
- It is strong and durable
 - It is lightweight.
 - It is cheaper than brick
 - It can be painted.
 - Walls can be built quickly with just one thickness of block
 - It provides good insulation from water and cold.
 - It is easy to maneuver.
- Q7:** True or False: When laying the first course of bricks for a wall, it should be laid dry (without mortar).
- Q8:** When laying bricks, what tool(s) should you use to check the height, alignment, and plumb of the brickwork? (Select all that apply.)
- story pole
 - bull float
 - bricklayer's rule
 - hawk
- Q9:** Which of the following can be used to level cast concrete? (Select all that apply.)
- bull float
 - hawk
 - darby
 - float
- Q10:** Match each word with its corresponding description.
- cupping
 - buttering
 - striking
 - rowlocks
 - tags
- Excess mortar that remains after finishing a joint.
 - Finishing a joint.
 - Header bricks laid on edge in a course.
 - Cutting off a wedge of mortar, shaping it to fit the trowel blade, and then scooping it up using your wrist, shaking off any excess.
 - Smoothing mortar on a brick with a trowel.

Assessment Questions Answer Key

Q1: Standard U.S. bricks are 4" (width) x 3" (height) x 8" (length) nominal size. If brick is to be laid with 1/2-inch head joints, what is the actual size of the brick?

- a) 4" x 3" x 8". The mortar joint makes no difference.
- b) 3 1/2" x 2 1/2" x 7 1/2"
- c) 3 1/2" x 2 1/2" x 8"
- d) 4 1/2" x 3 1/2" x 8 1/2"
- e) 4 1/2" x 3 1/2" x 8"

A1: *The correct answer is (b).*

Q2: Choose either "lime" or "sand": When mixing mortar, _____ is what makes the mortar more plastic and manageable, while _____ gives volume to the mortar.

A2: *When mixing mortar, **lime** is what makes the mortar more plastic and manageable, while **sand** gives volume to the mortar.*

Q3: What is the importance of watering down bricks, and what should you use to do it?

A3: *Use a hose to water down bricks. This keeps the bricks damp and helps prevent the bricks from absorbing too much moisture from the mortar.*

Q4: For precise cutting, angles, or extra-hard bricks, which of the following is the best statement about the appropriate tool(s) to use?

- a) Cut with a brickset and hammer.
- b) Cut with a circular saw with a masonry blade.
- c) Cut with a masonry saw with a masonry blade.
- d) Cut with a hand saw.

A4: *The correct answers are (b) and (c). You can use either a circular saw or a masonry saw to cut brick precisely.*

Q5: True or False: When jointing a block wall, use a sledrunner jointer for smooth, even joints.

A5: *This statement is true.*

Q6: What are some advantages of using concrete block as a building material? (Select all that apply.)

- a) It is strong and durable
- b) It is lightweight.
- c) It is cheaper than brick
- d) It can be painted.
- e) Walls can be built quickly with just one thickness of block
- f) It provides good insulation from water and cold.
- g) It is easy to maneuver.

A6: *The correct answers are (a), (c), (d), (e), and (f). Answers (b) and (g) are not correct because concrete block is actually heavier and difficult to maneuver.*

Q7: True or False: When laying the first course of bricks for wall, it should be laid dry (without mortar).

A7: *This statement is true.*

Q8: When laying bricks, what tool(s) should you use to check the height, alignment, and plumb of the brickwork? (Select all that apply.)

- a) story pole b) bull float c) bricklayer's rule d) hawk

A8: *The correct answers are (a) and (c).*

Q9: Which of the following can be used to level cast concrete? (Select all that apply.)

- a) bull float b) hawk c) darby d) float

A9: *The correct answers are (a), (c), and (d).*

Q10: Match each word with its corresponding description.

- a) cupping b) buttering c) striking
d) rowlocks e) tags

1. Excess mortar that remains after finishing a joint.
2. Finishing a joint.
3. Header bricks laid on edge in a course.
4. Cutting off a wedge of mortar, shaping it to fit the trowel blade, and then scooping it up using your wrist, shaking off any excess.
5. Smoothing mortar on a brick with a trowel.

A10: *1 (e); 2 (c); 3 (d); 4 (a); 5 (b).*

Additional Resources

American Design Drafting Association (ADDA)

www.adda.org

American National Standards Institute (ANSI)

www.ansi.org

Electronic Library of Construction, Occupational Safety and Health

www.cdc.gov/elcosh/docs/trade/mason.html

International Code Council

www.iccsafe.org

International Masonry Institute

www.imiweb.org

Masonry Advisory Council

www.maconline.org/home.html

Masonry Magazine

www.masonrymagazine.com

National Center for Construction Education and Research (NCCER)

www.nccer.org

National Concrete Masonry Association

www.ncma.org

National Park Service Essential Competencies

www.nps.gov/training/npsonly/MNT/mason.htm

Skills USA

www.skillsusa.org

The Masonry Society (TMS)

www.masonrysociety.org

Additional Resources at www.films.com

Available from Films Media Group • www.films.com • 1-800-257-5126

Bricklayers and Stonemasons

- DVD/ VHS
- Preview clip online (search on 32260)
- Correlates to educational standards
- Item # 32260

Dr. Doug Ullrich, an agricultural education instructor, teaches equipment identification, safety, and masonry techniques as he demonstrates how to build a brick wall and a block wall. Follow along as he selects the building material, sets up guide lines, mixes mortar, "butters" the bricks and blocks, lays rows, and explains clean-up procedures for building these standard structures. Dr. Ullrich also points out the consequences of poor workmanship. His tips on how to give your projects a professional look lay a proper foundation of masonry skills for the novice. Part of the series *Made with the Trades*. (13 minutes) ©2003

Basic Masonry

- VHS
- Item # 19257

Dr. Doug Ullrich, an agricultural education instructor, teaches equipment identification, safety, and masonry techniques as he demonstrates how to build a brick wall and a block wall. Follow along as he selects the building material, sets up guide lines, mixes mortar, "butters" the bricks and blocks, lays rows, and explains clean-up procedures for building these standard structures. Dr. Ullrich also points out the consequences of poor workmanship. His tips on how to give your projects a professional look lay a proper foundation of masonry skills for the novice. (45 minutes) ©1998

Masonry

- DVD/ VHS
- Preview clip online (search on 24223)
- Correlates to educational standards
- Item # 24223

Masonry is a fifteen-minute video which is part of the series *Vo/Tech: Ins and Outs*. This fast-paced, entertaining, and intriguing series introduces several occupations in the career pathway of masonry. (15 minutes) ©2001

Residential Masonry

- **DVD/ VHS**
- **Preview clip online (search on 26210)**
- **Correlates to educational standards**
- **Item # 26210**

In this video Shawn, our apprentice, tackles residential masonry. Working alongside a professional, he and the viewers learn basic skills in forming block wall foundations, different types of cement, and forming, pouring, and finishing concrete. We also learn skills in using mortar and bricklaying. From the series *Residential Construction*. (15 minutes) ©2000

Exterior Walls and Roof Construction

- **DVD/ VHS**
- **Item # 25383**

See installation of all types of exterior materials including siding, masonry, and windows. See rafters installed as well as trusses, plywood sheathing, roof vents, and more. (15 minutes) ©1992



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