pennsylvania DEPARTMENT OF EDUCATION
PROGRAMS OF STUDY

MASON/MASONRY
CIP Code 46.0101

Introduction

The Egyptian Pyramids, the Colosseum in Rome, India's Taj Mahal, the Great Wall of China - some of the world's most significant architectural achievements have been built with masonry. Through civilization, architects and builders have chosen masonry for its beauty, versatility, and durability. Masonry is resistant to fire, earthquakes, and sound. Artistic and durable, masonry structures can withstand the normal wear and tear of centuries.

Brick is man's oldest manufactured product and after more than 6000 years, masonry is still used today. Career opportunities abound in masonry - one only has to look around at office buildings, schools, bridges, houses, patios, and fireplaces, to notice that there are many aspects of society where forms of masonry exist. A Mason's work is diverse and creates buildings, fences, roads, walkways, and walls using bricks, concrete, blocks, and natural stone. The structures that Masons build will continue to be in demand for years to come – 70 % of the building in the world are built by Masons.

The level of complexity involved in masonry work varies from laying a simple masonry wall to installing an ornate exterior on a high-rise building. Whether working with brick, block, tile, terra-cotta, concrete or stone, and regardless of the level of craftsmanship involved, the skill and precision of the mason can never be replaced by machines.

Brick masons and block masons lay and bind building materials, such as brick, structural tile, concrete block, cinder block, glass block, and terra-cotta block, refractory tile with mortar and other substances to construct or repair walls, floors, fireplaces, chimney partitions, arches, sewers, and other structures. Stonemasons build stone structures, such as piers, walls, and abutments. They also lay walks, curbstones, or special industrial masonry for vats, tanks, and floors.

Cement masons and concrete finishers smooth and finish surfaces of poured concrete, such as floors, walks, sidewalks, roads, or curbs using a variety of hand and power tools. They align forms for sidewalks, curbs, or gutters; patch voids; use saws to cut expansion joints. Helpers for all the masons perform duties of lesser skills including using, supplying or holding materials or tools, and cleaning work areas and equipment.

Masons who realize the permanence of their work strive for quality. A mason's work is viewed as timeless because new and renovated masonry structures bring lasting beauty, solid economic savings, and an enhancement to communities.

Many masons will find future work in renovations and "green" masonry. A masonry building is environmentally friendly. It is beautiful, quiet, durable, adaptable, comfortable to occupants, and can be recycled. "Green" masonry will open opportunities for future masons. A green building is one that utilizes design and construction practices that significantly reduce or eliminate the negative impact of buildings on the environment and the building's occupants. A masonry building's life speaks to its reusability – a mason builds a building with good air quality, uses materials such as sand and rock that are not in short supply and are easily accessible, renewable and reusable. "Green" masonry technology will offer job prospects to those masons who understand use of local masonry materials, the use of

masonry as a natural insulating material and have the skill to refurbish an existing building's structure to comply with “green” restoration practices.

A mason will always be in a field of construction full of creative challenges and lasting rewards. Masonry is a skilled trade that takes much time, effort and talent to learn.

Completing a mason/masonry program will prepare career and technical education students for gainful entry-level employment as a: Brick mason, Stone mason, Block mason, Cement mason, Stucco mason, Tile & Marble Setter, Stone Setter, Mason Helper, Mortar Mixer, Segmental Paver, Concrete Finisher, Patio Installer, Construction Manager, Mason Restorator, First-Line Supervisor, Quality Assurance Inspector, Sampler/Tester Technician, Job Estimator, Supply Store Sales Representative or Independent Contractor.

Assumptions of This Program of Study

Students will demonstrate the ability to:

- Actively listen and understand points being made by co-workers, supervisors, contractors, and clients; and communicate orally in the language of the masonry industry
- Determine the kind of tools and equipment to complete the masonry project
- Identify building codes and ordinance specifications relative to a masonry project
- Document and ensure conformance to ordinance specifications
- Ensure that proper safety equipment, practices and regulations are used and followed
- Read blueprints accurately and interpret plans and mechanical drawings
- Describe various materials, methods, and the tools involved in the masonry construction or repair of masonry houses, buildings or other structures such as highways and roads
- Explain options of raw materials, production processes, quality control, costs, and other techniques for maximizing the masonry project expenditure
- Document and use accurate mathematical applications, involving arithmetic, algebra, plane geometry, calculus, and statistics used in masonry projects
- Record accurate work sheets and work related documents
- Write clear, legible, and concise material and labor estimate costs; explaining expenses and benefits of options and expenditures
- Perform basic manipulative skills of the masonry trades using hand tools such as floats, trowels, hammers, blocks and pulleys, and forms
- Perform basic use of power tools such as saws, torches, power trowels, jacks, drills, and welders
- Perform basic use of masonry equipment such as mixers, hoppers, concrete buckets, and spreaders,
- Describe various uses of masonry management software including CAD and concrete and masonry project application software programs
- Stay current with advancing principles and technical knowledge in masonry through “life long learning” and continuing education courses

High-quality programs should meet the following standards:

- Promote **positive working relationships**
- Implement a **curriculum** that fosters all areas of skill development

- Use **appropriate** and **effective teaching approaches**
- Provide **ongoing assessments** of student progress
- Employ and support qualified **teaching staff**
- Establish and maintain relationships and use resources of the **community**
- Provide a safe and healthy learning **environment**
- Implement strong program organization and supervision policies that result in **high-quality teaching and learning**
- Integrate academic skills and aptitudes necessary for postsecondary education, gainful employment and a foundation of **lifelong learning**

Academic Rigor

Research shows that career success requires the same level of college-prep courses as postsecondary success requires. The Department of Education's focus is to ensure that every student graduates prepared for college and a career. In order to be successful in this program of study, students should follow the academic sequence as determined by Pennsylvania's high school reform efforts.

Resources Used

- MAVCC (Multistate Academic Vocational Curriculum Consortium) http://www.mavcc.org/
- NOCTI (National Occupational Competency Testing Institute http://www.nocti.org/
- O*NET http://online.onetcenter.org/
- Pennsylvania Approved Certifications for Industry-Recognized Certifications for Career and Technical Education Programs http://www.portal.state.pa.us/portal/server.pt/community/instructional_resources/7392/industry-recognized_certifications_for_career_and_technical_education_programs/507887
- Pennsylvania Department of Labor & Industry High Priority Occupations http://www.portal.state.pa.us/portal/server.pt/community/high_priority_occupations/12910
- VTECS (A Consortium of Innovative Career and Workforce Development Resources) http://www.vtecs.org/

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46.0101 MASON/MASONRY

An instructional program that prepares individuals to apply technical knowledge and skills in the laying and/or setting of brick, concrete block, glass block, hard tile, marble and related materials using trowels, levels, hammers, chisels and other hand tools.

Integrate Academic Career Education and Work Standards for Student Success

As students participate in career exploration activities and rigorous studies from elementary grades through graduation, they learn to appreciate the relationship between their classroom learning and the skills needed within the workplace. The academic and workplace skills within the Academic Standards for Career Education and Work are expected to be addressed within classrooms and

achieved by all students throughout Pennsylvania. No student should leave secondary education without a solid foundation in these Standards.
http://www.portal.state.pa.us/portal/server.pt/community/state_board_of_education/8830/state_academic_standards/529102

CEW Standards Tool Kit for teachers to implement CEW Standards.
www.pacareerstandards.com

Pennsylvania Approved Certifications

http://www.portal.state.pa.us/portal/server.pt/community/instructional_resources/7392/industry-recognized_certifications_for_career_and_technical_education_programs/507887

The Program of Study Supporting Documents

- Mason/Masonry Crosswalk Template for Task Alignment (excel) – Instructions: Indicate the number code(s) of your school's program competency or competencies aligned to each program of study competency.
- Mason/Masonry Crosswalk Template for Task Alignment (pdf) – Instructions: Indicate the number code(s) of your school's program competency or competencies aligned to each program of study competency.
- Scope and Sequence Template (word) – Enter secondary and postsecondary technical Program of Study courses.
- Scope and Sequence Template (pdf) – Enter secondary and postsecondary technical Program of Study courses.
- PA Academic Standards/Eligible Content Alignment to Mason/Masonry Task List (excel) – Crosswalk of PA Academic Standards/Eligible Content for Reading, Writing, Speaking and Listening (RWSL), Math, and Science aligned to Program of Study Secondary Competency List. (will be available soon)
- PA Academic Standards/Eligible Content Alignment to Mason/Masonry Task List (pdf) – Crosswalk of PA Academic Standards/Eligible Content for Reading, Writing, Speaking and Listening (RWSL), Math, and Science aligned to Program of Study Secondary Competency List. (will be available soon)

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