

## MINUTEMAN MIDDLE SCHOOL TECHNICAL LITERACY

## “GREY BLOCK” ELECTIVE

### **Contact Information:**

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### **The Department’s Educational Philosophy**

Minuteman Regional High School’s Middle School Program for Technical Literacy (previously called “Outreach”) dedicates itself to exposing students to the many different forms of engineering through a variety of hands-on projects and lessons. The program also prepares students for the 8<sup>th</sup> grade MCAS Science & Technology exam. All lessons are built around the Massachusetts Dept. of Education’s Science & Technology Frameworks.

### **Guiding Principles**

Students will be exposed to the process involved with construction technologies, as well as the materials, tools and machines used in residential house construction.

- Students will follow the Engineering Design Process, while learning to read architectural blueprints and design a housing frame around that design.
- The 15-day class will follow the process a similar house project would follow: plan, foundation, framing, flooring, door jams, window frames, hip roof plan.

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**Course Frequency:** 15 class periods, total

**Credits Offered:** n/a

**Prerequisites:** n/a

### Background to the Curriculum

Students will translate an architectural floor plan into a scaled model house frame. Following strict estimating limits, students must calculate the materials necessary to complete the framing project.

### Core Topics/Questions/Concepts/Skills

Residential home construction, House framing, Construction technologies, Site planning and prep, materials prep and estimating, Architecture and standards

### Course-End Learning Objectives

<u>Learning objectives</u>	<u>Corresponding state standards, where applicable</u> <i>(From the MA D.O.E. Science &amp; Technology Framework)</i>
<ol style="list-style-type: none"><li>1) Introduce students to the materials used in residential house construction, from a concrete foundation, anchor bolts and drainage to the plumbing, electrical and wooden house framing.</li><li>2) Students will learn to read and understand an architectural floor plan, which will ultimately be the plan followed for their house construction.</li><li>3) Students will estimate and calculate the amount of lumber (in board-feet) needed to construct their house frame project.</li><li>4) Following their house plan outline, students will follow a scaled design (while paying attention to strict building standards) and construct a house frame, complete with exterior and interior walls, door frames and window frames.</li><li>5) Students will use hand saws, band saws, hand sanders, dremel tools and wood glue to construct their models.</li></ol>	<ol style="list-style-type: none"><li>1.1 Identify and describe characteristics of natural materials (e.g., wood, cotton, fur, wool) and human-made materials (e.g., plastic, Styrofoam).</li><li>1.2 Identify and explain some possible uses for natural materials (e.g., wood, cotton, fur, wool) and human-made materials (e.g., plastic, Styrofoam).</li><li>2.1 Identify a problem that reflects the need for shelter, storage, or convenience</li><li>5.1 Describe and explain parts of a structure (e.g., foundation, flooring, decking, wall, roofing systems).</li></ol>

**Assessment:** As this is an ungraded class, students will be expected to participate and follow all safety rules and classroom guidelines. Project completion will dictate any and all grading or participation measurement.

**Technology and Health Learning Objectives Addressed in This Course**

**(This section is for faculty and administrative reference; students and parents may disregard.)**

<b><u>Course activity: skills and/or topics taught</u></b>	<b><u>Standard(s) addressed through this activity</u></b>
<ul style="list-style-type: none"><li>1) Hot Glue Gun Safety</li><li>2) Safety Quizzes required for class</li><li>3) Sandcrete measuring, mixing, pouring and curing.</li><li>4) Cutting and shaping of wall studs and board feet</li></ul>	<ul style="list-style-type: none"><li>1.1 Given a design task, identify appropriate materials (e.g., wood, paper, plastic, aggregates, ceramics, metals, solvents, adhesives) based on specific properties and characteristics (e.g., weight, strength, hardness, and flexibility).</li><li>1.2 Identify and explain appropriate measuring tools, hand tools, and power tools used to hold, lift, carry, fasten, and separate and explain their safe and proper use.</li><li>1.3 Identify and explain the safe and proper use of measuring tools, hand tools, and machines (e.g., band saw, drill press, sanders, hammer, screwdriver, pliers, tape measure, screws, nails, and other mechanical fasteners) needed to construct a prototype of an engineering design.</li></ul>

**Materials and Resources**

- √ Sandcrete
- √ Plywood
- √ Pine wood strips (2" x 6')
- √ Hot glue guns
- √ Measuring tools
- √ Pencils & Sharpies
- √ T-squares
- √ Bubble levels