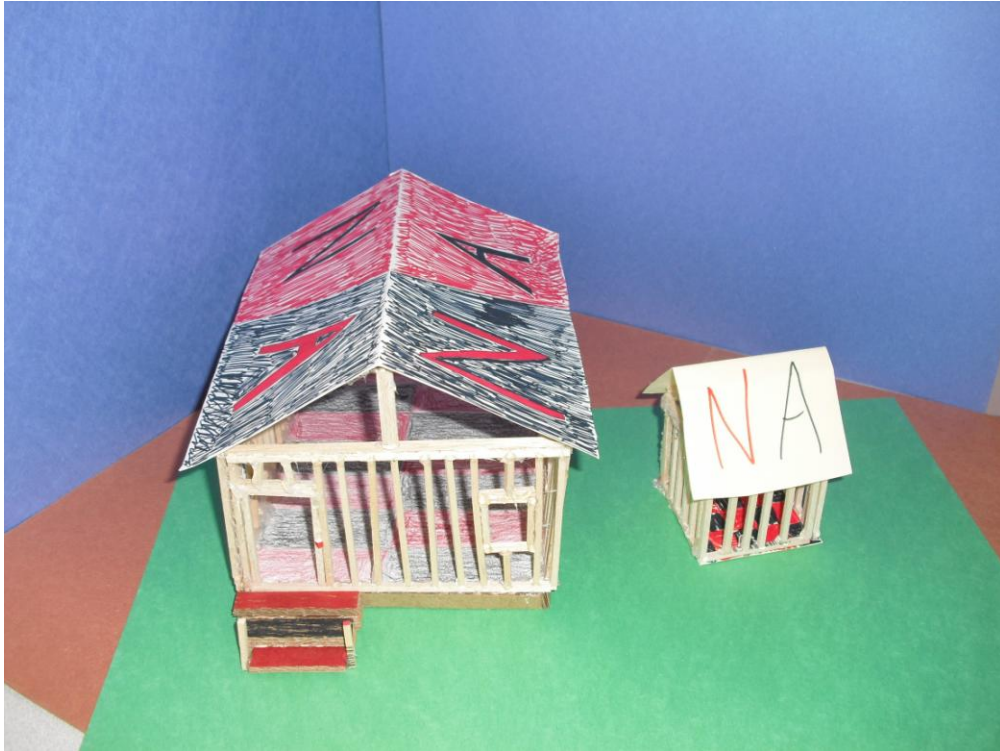


Technology Learning Activity

Scale Model House Project



Construction in Technology Education
ITEC 8700
Summer II 2012
Prepared by Larry Lambert

Title: Technology Learning Activity – Scale Model House Project

Goal:

The student will be able to describe and identify the parts of a structure, e.g., foundation, flooring, decking, wall, roofing systems.

Learning Objectives:

- The student will be able to list and give examples of the parts of a structure.
- The student will be able to design and create a scaled drawing of a properly framed structure.
- The student will be able to identify the appropriate materials, tools, and machines needed to construct a prototype of their house and construct that prototype.
- The student will be able to define and use content-specific vocabulary, terminology, and jargon unique to construction.

Assessment:

Construction Fundamentals Quiz
Evaluation of Scale Drawing (Project Rubric)
Evaluation of Balsa Wood Model (Project Rubric)
(for the actual items, see the Handouts section)

Frameworks connections:

The following learning standards, which are covered in this lesson, are from the Technology/Engineering Learning Standards for a Grades 6 through 8 found in the Massachusetts Curriculum Frameworks for Science and Technology/Engineering, 2006.

Materials, Tools, and Machines

Central Concept:

Appropriate materials, tools, and machines enable us to solve problems, invent, and construct.

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.

1.3 Identify and explain the safe and proper use of measuring tools, hand tools, and machines (e.g., band saw, drill press, sander, hammer, screwdriver, pliers, tape measure, screws, nails, and other mechanical fasteners) needed to construct a prototype of an engineering design.

Engineering Design

Central Concept

Engineering design is an iterative process that involves modeling and optimizing to develop technological solutions to problems within given constraints.

2.2 Demonstrate methods of representing solutions to a design problem, e.g., sketches, orthographic projections, multiview drawings.

2.3 Describe and explain the purpose of a given prototype.

2.4 Identify appropriate materials, tools, and machines needed to construct a prototype of a given engineering design.

2.5 Explain how such design features as size, shape, weight, function, and cost limitations would affect the construction of a given prototype.

Communications

Central Concept:

Ideas can be communicated through engineering drawings, written reports, and pictures.

3.2 Identify and explain the appropriate tools, machines, and electronic devices (e.g., drawing tools, computer-aided design, and cameras) used to produce and/or reproduce design solutions (e.g., engineering drawings, prototypes, and reports).

Construction Technologies

Central Concept:

Construction technology involves building structures in order to contain, shelter, manufacture, transport, communicate, and provide recreation.

5.1 Describe and explain parts of a structure, e.g., foundation, flooring, decking, wall, roofing systems.

Cross-Curriculum connections:

Common Core

Math:

Solve problems involving scale drawings of geometric figures, such as computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

Materials:

Lab Equipment:

Balsa Wood Cutters, Hot Glue Guns, Silicone Glue Mats (optional but strongly recommended)

Consumables:

11x17 grid paper (for scale drawing), Balsa Wood (1/8 x 1/8 and 1/8 x 1/4), Glue Slugs, Oaktag (For Sheathing and Decking)

Handout sheets prepared by teacher.

PowerPoint Presentation prepared by teacher.

Selection of quotes for students to encode/decode.

Design Overview:

Students are given the task of designing and then building a scale model (1"=3') balsa wood house. Scale is applied to construction member spacing only.

In order to reduce cost and minimize the variety of balsa wood required, 1/8 x 1/8 strips are used for wall studs while 1/8" x 1/4" strips are used for joists and rafters.

Requirements include:

- The perimeter of the scale model must not exceed 28 inches.
- Each house must include at least 2 doors.
- Each wall must include at least 1 window.

Activity

Working in groups of two, students will complete the following phases of the project:

Scale Drawing

Using the 11x17 grid paper, students design and draw an orthographic drawing of their house showing all 4 walls. The drawing will be a full scale drawing of the model that they will be constructing in the next phase of the project.

Materials Estimation

Using their scale drawing, students will estimate how many 24" or 36" balsa wood strips will be required to complete their model. After reviewing calculations with the students, students are provided with balsa wood and begin construction of their prototype.

Resources:

Text: Technology: Shaping Our World, By Gradwell, Welch and Martin, Goodheart-Willcox Company, Tinley Park, IL, 2000. pp.109-120.

<http://home.howstuffworks.com/home->

[improvement/repair/house8.htmhttp://web.mit.edu/invent/iow/morse.html](http://web.mit.edu/invent/iow/morse.html)

Handouts: On following pages.

Project Rubric Scale Model House Construction	0%	60%	70%	80%	90%	100%
	0	1	2	3	4	5
Project shows evidence of Design Process 1 2 3 4 5 6 7 8						
Project has thumbnail sketches.						
Project has a complete set of final detailed drawings with accurate dimensions and specifications.						
Student works safely in a lab setting.						
Project shows evidence of craftsmanship and attention to detail.						
Final product functions according to established criteria.						
Student works well in a team.						
Student demonstrates punctuality, regular attendance and good work ethic.						
Student demonstrates proper use and respect of lab equipment.						
Student demonstrates respect for peers and teacher.						

Possible score = 50 Points

Total Score =

50 Total Score = Final Score %

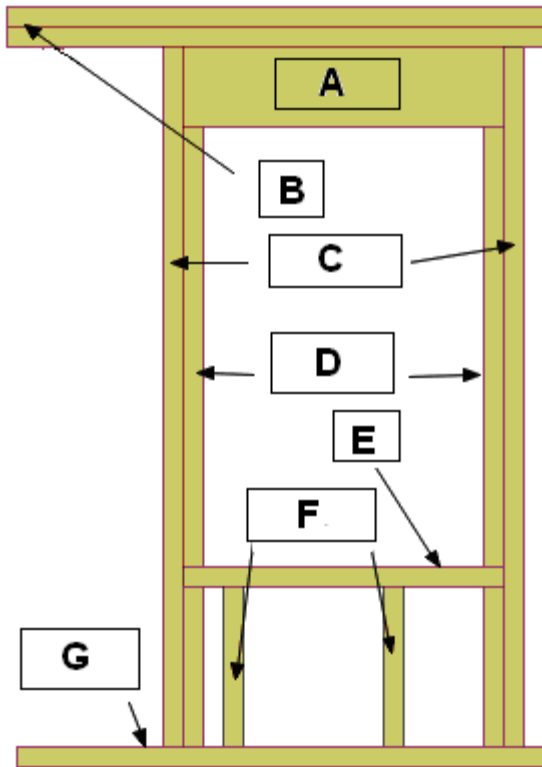
Final Score =

Name _____

Date _____

Grade 6 Construction Quiz

7. Identify the following framing members.



A	
B	
C	
D	
E	
F	
G	

Identify the type of roof shown on each of the following houses.

