



MODEL DESIGN AND BUILDING MERIT BADGE WORKBOOK

This Scoutmaster Bucky Merit Badge Workbook is based off the current *Scouts BSA Requirements*.

Consider also using the Model Design and Building merit badge class preparation page for clarification and expectations when participating in a Scoutmaster Bucky merit badge opportunity ([online](#) or [in-person](#)).

<https://scoutmasterbucky.com/merit-badges/model-design-and-building/>

Scout's Name:

REQUIREMENT 1: Study and understand the requirements for personal safety when using such modelmaker hand tools as knives, handsaws, vises, files, hammers, screwdrivers, hand drills and drill bits, pliers, and portable power tools, and when to use proper protective equipment such as goggles when grinding or drilling. Know what precautions to take when using flammable or hazardous products such as glue, epoxy, paint, and thinners. Discuss these with your counselor before you begin your modelmaking project and tell why they are important.

REQUIREMENT 2: Explain the uses for each of the following types of models: architectural, structural, process, mechanical, and industrial. Do research into the different types of materials that could be used in making these models.

Architectural

Structural



Process

Mechanical

Industrial

REQUIREMENT 3: With your counselor's advice, select a subject from requirement 4 for your model project. Kits may not be used. Prepare the necessary plans to the proper scale. This model should be your own original work. Tell your counselor why you selected this project



REQUIREMENT 4: Do ONE of the following:

Notes for the discussion portion of the requirement

REQUIREMENT 4 A: Make an architectural model. Build a model of a house to a scale of $1/4" = 1'0"$ (1:50 scale). After completing the model, present it to your counselor for approval. Review with your counselor the materials you used and the details of your model.

Completed

REQUIREMENT 4 B: Build a structural model. Construct a model showing corner construction of a wood-frame building to a scale of $1 1/2" = 1'0"$ (1:8 scale). All structures shown must be to scale. Cardboard or flat sheet wood stock may be used for sheeting or flooring on the model. Review with your counselor the problems you encountered in gathering the materials and supporting the structure. Be able to name the parts of the floor and wall frames, such as intermediate girder, joist, bridging, subfloor, sill, sole plate, stud, and rafter.

Completed

REQUIREMENT 4 C: Make a process model. Build a model showing the plumbing system in your house. Show hot and cold water supply, all waste returns, and venting to a scale of $3/4" = 1'0"$ (1:15 scale). After completion, present the model to your counselor. Discuss the scale, the materials used, and any problems you encountered in building the model.

Completed

REQUIREMENT 4 D: Complete a mechanical model. Build a model of a mechanical device that uses at least two of the six simple machines. After completing the model, present it to your counselor. Be prepared to discuss materials used, the machine's function, and any particular difficulty you might have encountered.

Completed

REQUIREMENT 4 E: Make an industrial model. Build a model of an actual passenger-carrying vehicle to a scale of $1" = 1'0"$ or $1/2" = 1'0"$ (1:10 or 1:25 scale). Take the dimensions of the vehicle and record the important dimensions. Draw the top, front, rear, and sides of the vehicle to scale. From your plans, build a model of the vehicle. Discuss with your counselor the most difficult part of completing the model.

Completed

REQUIREMENT 5: Build a special-effects model of a fantasy spacecraft or a hand-held prop that might appear in a Hollywood science-fiction movie. Determine an appropriate scale for your design. Include a cockpit or control area, living space, storage unit, engineering spaces, and propulsion systems. As you plan and build your model, do the following:

Completed



REQUIREMENT 5 A: Study existing designs of vehicles and hand-held devices.

Completed

REQUIREMENT 5 B: Arrange and assemble the parts.

Completed

REQUIREMENT 5 C: Sketch your completed model.

A large, empty rectangular box with a black border, intended for the student to draw a sketch of their completed model.



REQUIREMENT 5 D: Discuss your design, scale, and materials choices with your counselor. Describe how you engineered your model and discuss any difficulties you encountered and what you learned.

REQUIREMENT 6: List at least six occupations in which modelmaking is used and discuss with your counselor some career opportunities in this field.