



## Model Design and Building Merit Badge Workbook

# SCOUTMASTER BUCKY

Scouts participating in a Scoutmaster Bucky merit badge opportunity, whether online or in person, should consider using the Model Design and Building merit badge pamphlet for discovery and knowledge, along with the class preparation pages for clarifications, insights, and expectations.

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

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

**REQUIREMENT 1:** Study and understand the requirements for personal safety when using modelmaker hand tools such as knives, handsaws, vises, files, hammers, screwdrivers, hand drills and drill bits, pliers, and portable power tools.

Notes:

**REQUIREMENT 1:** Study and understand when to use proper protective equipment such as goggles when grinding or drilling.

Notes:



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**REQUIREMENT 1:** Know what precautions to take when using flammable or hazardous products such as glue, epoxy, paint, and thinners.

Notes:

**REQUIREMENT 1:** Discuss these with your counselor before you begin your modelmaking project and tell why they are important.

Notes:



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### 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:

Use of this type of model:

Materials that could be used:

#### STRUCTURAL:

Use of this type of model:

Materials that could be used:

#### PROCESS:

Use of this type of model:



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Materials that could be used:

### MECHANICAL:

Use of this type of model:

Materials that could be used:

### INDUSTRIAL:

Use of this type of model:

Materials that could be used:



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### 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.

Notes:

### DO ONE OF THE FOLLOWING (4A, 4B, 4C, 4D, or 4E) FOR REQUIREMENT 4

#### REQUIREMENT 4a:

Make an architectural model. Build a model of a house to a scale of  $\frac{1}{4}" = 1'0"$  (1:48 metric). Discuss with your counselor the materials you intend to use, the amount of detail required, outside treatment (finish, shrubbery, walks, etc.), and color selections. After completing the model, present it to your counselor for approval.

Notes:

#### REQUIREMENT 4b:

Build a structural model. Construct a model showing corner construction of a wood-frame building to a scale of  $1\frac{1}{2}" = 1'0"$  (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.

Notes:



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**REQUIREMENT 4c:** 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  $\frac{3}{4}$ " = 1'0" (1:16 metric). Talk to your counselor about how to begin this model, and present the scale and the materials you will use. After completion, present the model to your counselor, and be prepared to discuss any problems you had building this model.

Notes:

**REQUIREMENT 4d:** 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.

Notes:

**REQUIREMENT 4e:** Make an industrial model. Build a model of an actual passenger-carrying vehicle to a scale of 1" = 1'0" or  $\frac{1}{2}$ " = 1'0" (1:12 or 1:24 metric). 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 and finish it in a craftsman like manner. Discuss with your counselor the most difficult part of completing the model.

Notes:



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### 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:

- Study existing designs of vehicles and hand-held devices.
- Arrange and assemble the parts.
- Sketch your completed model.
- 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.

Don't forget to bring your sketch and model to share with the merit badge counselor

**This requirement must be reviewed with your merit badge counselor.**

**BE PREPARED!**

Notes:



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

Career Opportunity #1:

Career Opportunity #2:

Career Opportunity #3:

Career Opportunity #4:

Career Opportunity #5:

Career Opportunity #6:

Notes: