



# MODEL DESIGN AND BUILDING

## Merit Badge Requirements

- 1) Study and understand the requirements for personal safety when using such modelmaker hand tools as: knife, scissors, handsaws, scratch awl, files, hammer, screwdriver, hand drills and drill bits, pliers, and wire cutters. Know what precautions to take when using flammable or hazardous products such as: glue, epoxy, paint, thinners, and proper protective equipment such as goggles to be used when grinding or drilling. Discuss these with your counselor and tell why they are important before you begin your model-making project.
- 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.
- 3) With your counselor's advice, select a subject from requirement 4 for your model project (no kits). Prepare the necessary plans to the proper scale, a list of materials to be used, and a list of the required tools. This model should be your own original work. Tell why you selected this subject.
- 4) Do ONE of the following:
  - A) **Architectural Model**  
Build a scale model of a house you select to a scale of  $\frac{1}{4}''=1'0''$  (50:1 Metric). Discuss with your counselor the materials you intend to use, the amount of detail required, house outside treatment (finish, shrubbery, walks, etc.) and color selections. After completion of the model, present it to your counselor for approval.
  - B) **Structural Model**  
Build a model showing corner construction of a wood frame building to a scale of  $1\frac{1}{2}''=1'0''$  (8:1 Metric). All structure shown must be to scale. Cardboard or flat sheet Woodstock may be used for sheeting or flooring on the model. Review with your counselor the problems you encountered in gathering the material and supporting the structure. Be able to name the parts of the wall section, such as: stud, sole plate, bridging, rafter, subfloor, girder, and joist.
  - C) **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  $\frac{3}{4}''=1'0''$  (15:1 Metric). Talk to your counselor about how to begin this model, present the scale and the materials you will use. After completing, present the model to your counselor and be prepared to discuss any problems you had building this model.
  - D) **Mechanical Model**  
Build a model of a mechanical device that should use at least two of the six simple machines. After completion of the model, present it to your counselor. Be prepared to discuss materials used, the machine's function and use, and any particular difficulty you may have encountered.
  - E) **Industrial Model**  
Build a model of an actual passenger-carrying vehicle to a scale of  $1''=1'0''$  or  $\frac{1}{2}''=1'0''$  (10:1 or 25:1 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 to scale. From your plans, build a model of the vehicle and finish in a craftsman like manner. Discuss with your counselor the most difficult part of completing this model.
- 5) List at least six occupations in which modelmaking is used and discuss with your counselor some career opportunities in this field.



## Requirement 2

Explain the uses for each of the following types of models. Also, do some research into the different types of materials that could be used in making these models:

Architectural: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Materials Used: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Structural: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Materials Used: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Process: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Materials Used: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Mechanical: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Materials Used: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Industrial: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Materials Used: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## Requirement 4

For this requirement you have been asked to build a model. You have been given five options for the type of model you will build. Select a type of model then complete the requirements for the specific type of model you have chosen.

If you selected **Option A: Architectural Model**:

\_\_\_ Build a scale model of a house you select to a scale of  $\frac{1}{4}''=1'0''$  (50:1 Metric).

Give a brief description of the house: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

In requirement 3 you listed the types of material do you intend to use for the building of your model. Describe the amount of detail you will include: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Tell about the outside treatment that was, or will be used: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Tell about the colors you have selected for your model: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_ After completion of the model, present it to your counselor for approval.

If you selected **Option B: Structural Model**:

Build a model showing corner construction of a wood frame building to a scale of  $1\frac{1}{2}''=1'0''$  (8:1 Metric). All structure shown must be to scale. Cardboard or flat sheet Woodstock may be used for sheathing or flooring on the model.

Tell about the problems you encountered in gathering the materials and supporting the structure: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_ Be able to name the parts of the wall section. Point them out and name them for your counselor when you show them your completed model.

\_\_\_ Stud    \_\_\_ Sole Plate    \_\_\_ Bridging    \_\_\_ Rafter    \_\_\_ Subfloor    \_\_\_ Girder    \_\_\_ Joist

If you selected **Option C: 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  $\frac{3}{4}''=1'0''$  (15:1 Metric).

Talk to your counselor about how to begin this model. What did you discuss? \_\_\_\_\_

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\_\_ Present the scale and the materials you will use.

\_\_ After completion, present the model to your counselor.

Briefly describe any problems you had building this model: \_\_\_\_\_

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If you selected **Option D: Mechanical Model**:

Build a model of a mechanical device that should use at least two of the six simple machines. Give a brief description of the model you intend to build: \_\_\_\_\_

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What materials do you plan to use for your model?

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Describe the function and use of the model you built: \_\_\_\_\_

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Tell about any problems or difficulty you may have encountered: \_\_\_\_\_

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\_\_ Present your model to your counselor for approval.

