

Model Design and Building

Merit Badge Workbook

Scout Requirements #33215. M	to read the merit badge pamphlet (book). No one can add or subtract from the Boy lerit Badge Workbooks and much more are below: <u>Online Resources</u> . <u>ncoln.com</u> . Requirements revised: 2003, Workbook updated: April 2008.
Scout's Name:	Unit:
Counselor's Name:	Counselor's Ph #:
1. Study and understand the requirements the	for personal safety when using such modelmaker hand tools as
knives,	
handsaws,	
vises,	
files,	
screwdrivers,	
hand drills and drill bits,	
pliers,	
and portable power tools,	
and when to use proper protective equipme	ent 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 y	you begin your modelmaking project and tell why they are important

2. Explain the uses for each of the following types of models:

architectural,						
process,						
mechanical,						
and industrial.						
Do research into the d	ifferent types of materials that could b	e used in making these models				
3. With your counselor	's advice, select a subject from requir	ement 4 for your model project (no kits)				
Prepare the necessary	plans to the proper scale,					
Make a list of materials						
	D					
	□					
	□	□				
and a list of the require	ed tools.					
□		□				
		□				
		□				
		selected this subject.				
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4. Do ONE of the following:

 \Box a. Make an architectural model. Build a model of a house to a scale of $\frac{1}{4}$ " = 10" (50:1 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.

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-OR- \Box b. Build a structural model. Construct a model showing corner construction of a wood-frame building to a scale of 1 $\frac{1}{2}$ " = 10" (8:1 metric). 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.

-OR- \Box 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 $\frac{3}{4}$ " = 10" (15:1 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.

-OR- \Box 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.

-OR- \Box e. Make an industrial model. Build a model of an actual passenger-carrying vehicle to a scale of 1" = 10" or $\frac{1}{2}$ " = 10" (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 and finish it in a craftsmanlike manner. Discuss with your counselor the most difficult part of completing the model.

5.
Build a special-effects model of a fantasy spacecraft that might appear in a Hollywood science-fiction movie.
Determine an appropriate scale for your design-one that makes practical sense. 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:

 $\hfill\square$ a. Study aircraft, submarines, and naval ships for design ideas.

 \Box b. Arrange and assemble the parts.

 \Box c. Sketch your completed model.

□ d. Write a short essay in which you discuss your design, scale, and materials choices. Describe how you engineered your model and discuss any difficulties you encountered and what you learned.

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

Occupations	Career Opportunities			

Online Resources (Use any Internet resource with caution and only with your parent's or guardian's permission.)

Boy Scouts of Americ	a: ► <u>scouting.org</u>	► Guide to Safe S	couting ► A	Age-Appropriate Guidelines	Safe Swim Defense		
► <u>Scout</u>	Tenderfoot	Second Class	► First Class	Rank Videos	Safety Afloat		
Boy Scout Merit Badge Workbooks: <u>usscouts.org</u> -or- <u>meritbadge.org</u> Merit Badge Books: <u>www.scoutstuff.org</u>							
FineScale Modeler: http://www.finescale.com							
Model Airplane News: http://www.modelairplanenews.com							
Modeltec magazine: http://www.thecrookstons.com/modeltec							
Scale Auto Magazine: http://www.scaleautomag.com							
Organizations and Web Sites: http://www.modelaircraft.org							
Association of Professional Model Makers: http://www.modelmakers.org							
International Plastic Modelers' Society USA: http://www.ipmsusa.org							
North American Model Engineering Society: http://www.modelengineeringsoc.com							