

Model Design and Building

Materials Needed:

- Modelling Clay
- Popsicle sticks
- Wire
- Tooth picks
- Pipe cleaners
- Styrofoam
- Glue
- Rulers
- Scissors
- Corrugated plastic boards

All Requirements:

1. Study and understand the requirements for personal safety when using such modelmaker hand tools such as knives, handsaws, vices, 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.

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. 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.

4. Do ONE of the following:

- (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.
- (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.
- (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.

- (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.
- (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.

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:

- (a) Study existing designs of vehicles and hand-held devices.
- (b) Arrange and assemble the parts.
- (c) Sketch your completed model.
- (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.

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

Syllabus

Day One:

Allow Scouts to roll into the first session while taking attendance and blue cards. Once everyone is on the roster begin class by covering Req 1 and other safety protocol.

Bring Examples of Models to class to help show what is expected.

Before the end of class explain requirements 4 and 5 and they kind of time that will be available in class.

Req 1. Study and understand the requirements for personal safety when using such modelmaker hand tools such as knives, handsaws, vices, 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.

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. 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.

Day Two

Scouts should arrive to class with an idea of what model they would like to make and begin working on this model after a brief review of their options.

Instructors should be present to help aid and assist any scout that needs help, or is not working at a quick enough pace. This project needs to be done before or during the next class.

4. Do ONE of the following:

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- (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.

Day Three

Scouts need to finish requirement 4 during this class so they will have enough time to complete requirement 5. Any Scout who is behind should be assisted by their instructor. Scouts who are done with req 4 can start req 5, they should already know what they are doing as the instructor has given Scout ample time to prepare and decide what they would like to make.

4. and 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:

- (a) Study existing designs of vehicles and hand-held devices.
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- (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.

Day Four

Inevitably Scouts will still need this time to work on their projects

4. 5.

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