

Model Design & Building Merit Badge

Model Building Materials

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Model Building Materials

Why should you know something about materials?

- Choosing the appropriate material for object being modeled (shape, size, texture)
- Has sufficient strength to hold shape and support the model
- Ease of working (cutting, forming, finishing) with tools you have available
- Choosing the right glues, fasteners or adhesives to join the pieces of your model
- Is the material readily available to you?
- Cost of the material
- Ability to be painted, if necessary for the subject being modeled

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Sources of modeling material

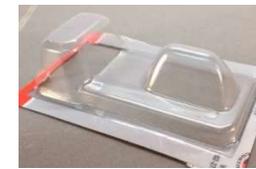
- Hobby and craft stores
- Hardware and home improvement stores
- Materials found at home including “trash” and recycle materials
- Natural materials

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Around the house

- Plastic bottles
 - Use for tanks, rocket bodies and other cylindrical objects
- Bottle caps
 - Wheels, turrets, radar antennae
- Clear plastic packaging
 - Windows, canopies
- Food cans
 - Use for tanks, rocket bodies and other cylindrical objects
 - Cut and flatten for sheet metal pieces

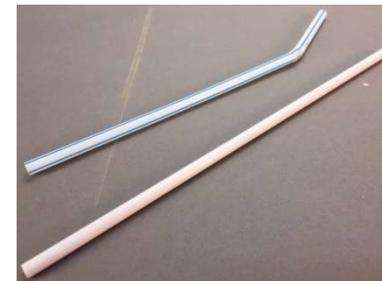


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Around the house

- Aluminum cans
 - Use for tanks, rocket bodies and other cylindrical objects
 - Cut and flatten for sheet metal pieces
- Aluminum foil
 - Shiny metal covering
- Drinking straws
 - Pipes and other cylindrical objects



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Around the house

- Clear food wrap
 - Windows
- Newspaper (paper mache)
 - Sculpt shapes
 - Landscape features

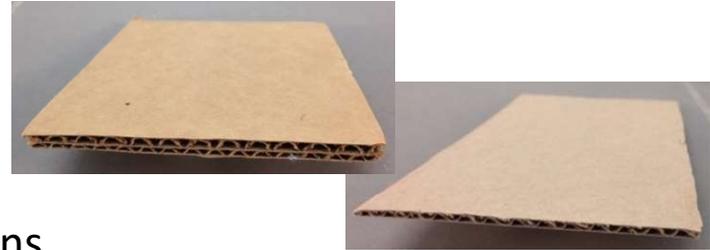


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Cardboard and paper

- Corrugated cardboard boxes
 - Strong, lightweight structures
 - Strong and rigid in direction of corrugations
 - Not so rigid across corrugations
- Food packages
 - Cereal and cracker boxes
 - Generally thin, hard cardboard
 - Use for supporting structure and finish surfaces
 - Glossy surfaces are easy to paint
- Writing tablet and notebook backing
 - Softer and usually thicker than food boxes
 - Use for supporting structure
- Stiffening cardboard sheets used in packaging
 - Very similar to tablet backing

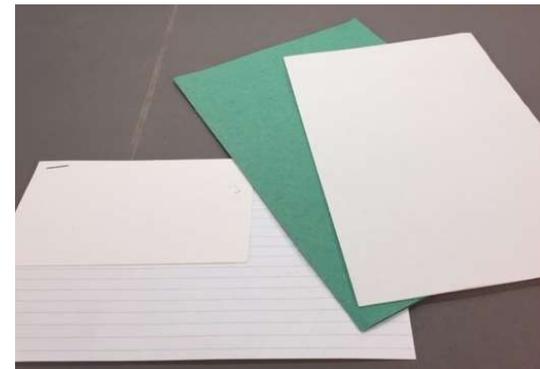


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Cardboard and paper

- Cardboard tubes (toilet paper, paper towels)
 - Very similar to tablet backing
 - Use for cylindrical objects
- Index cards
 - Thin, light weight cardboard
 - Smooth surface
 - Available in many sizes
- Construction paper
- Letter paper
- Wrapping paper



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Plastic

- Foam sheet insulation
 - Available at home improvement stores
 - Sold in sheets ½ to 2 inches thick
- Foam food packaging trays
- Foam packing sheets and blocks
- Foam craft shapes
 - Available at craft stores
 - Various geometric shapes

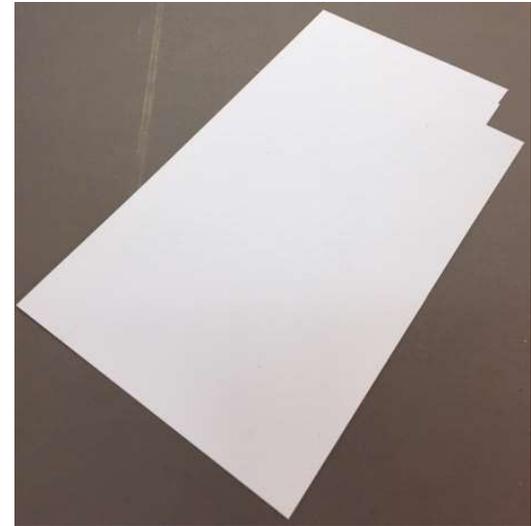


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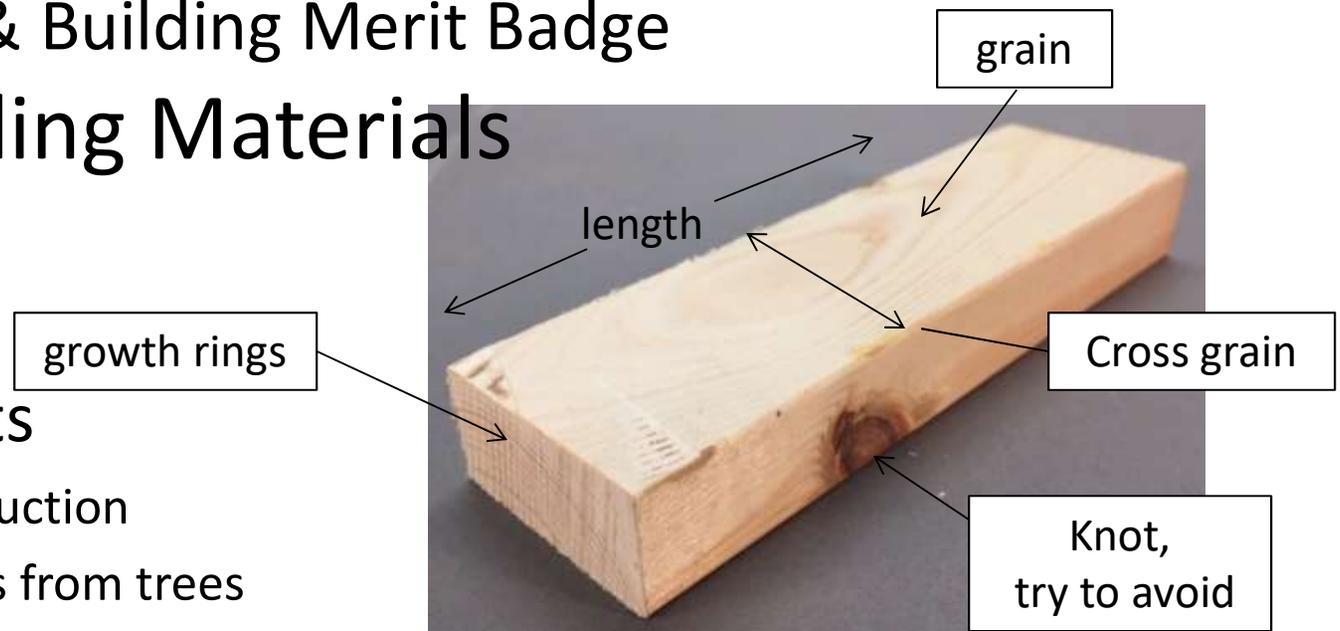
Plastic

- Plastic sheets and shapes
 - Often made of polystyrene
 - Available at craft and hobby stores
 - Sold in sheets, both plain and textured and shapes like rods, strips, I-beams, angles, “T”s
- PVC pipe
 - Available at home improvement stores



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Wood products

- Wood, an introduction
 - Wood comes from trees
 - Trees grow upright with concentric rings marking each year's growth
 - Boards are cut lengthwise from tree trunks
 - The rings appear in the boards as lengthwise patterns called "grain"
 - Wood is stronger in the lengthwise direction, "with the grain"
 - Wood is less strong side to side, "cross grain"
 - When using wood in model building, or any other use, pieces should be designed, cut and assembled to utilize the greater lengthwise strength

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Wood products

- Craft sticks or popsicle sticks
 - Thin, narrow wood strips
 - Readily available
 - Use for siding, flooring, truss members
- Toothpicks
 - Round or square cross-section
 - Use for railings, balusters, axles
- Dowel rod
 - Round wood rods
 - Available in many different diameters
 - Use for columns, poles, axels, wheels



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Wood products

- Balsa wood
 - Very soft, light wood
 - Thin sheets and strips
 - Available in craft and hobby stores
- Dimensional lumber
 - 1x2, 2x4, etc.
 - Pine is the best choice
 - Look for knot free, fine grain grade
 - May require power tools to cut to sizes
- Strip wood (pine and basswood most common)
 - Precut thin strips
 - Available in craft and hobby stores



1 x 2



2 x 4



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Wood products

- Particle board
 - Coarse wood chips formed into sheets
 - Rough surface
 - Use for bases, rough structure
- MDF (medium density fiber board)
 - Fine wood particles formed into sheets
 - Smooth surface
 - Soft, easily cut
- Masonite (high density fiber board)
 - Fine wood particles highly compressed
 - Sold in thin sheets
 - Very hard, smooth surface



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Wood products

- Plywood
 - Sheets made of multiple thin layers of wood bonded together
 - Grain direction turned 90 degrees for each layer (ply)
 - Has uniform strength in all directions
 - Available in thicknesses from 1/8 " to 3/4"
 - Available in grades from rough sheathing to fine cabinet finish
 - Includes paneling
 - Better quality will have more plies
 - Available at home improvement stores
 - Very fine grades available at specialized woodworking stores



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Other materials

- Pins
- Tacks
- Sewing thread
- Wire
- Window screen
- Sandpaper



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Natural materials

- Twigs and small branches
- Rocks, gravel, sand
- Sawdust
- Soil



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- **This is just a partial list of ideas.**
- **You are only limited by your imagination!**

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Which materials might you use to build a model of a rocketship?

<https://youtu.be/kp7ExAZL8i0>

Or

<https://youtu.be/vtoamtqDGDk>