

Model Design & Building Merit Badge

**Model Building Materials**

# Model Design & Building Merit Badge

## 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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## Model Building Materials

### **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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## Model Building Materials

### 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

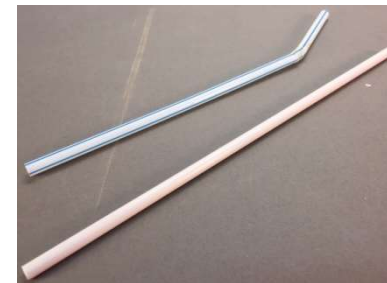


# Model Design & Building Merit Badge

## Model Building Materials

### 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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## Model Building Materials

### Around the house

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

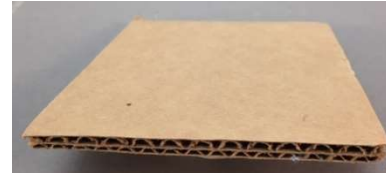


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## Model Building Materials

### 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

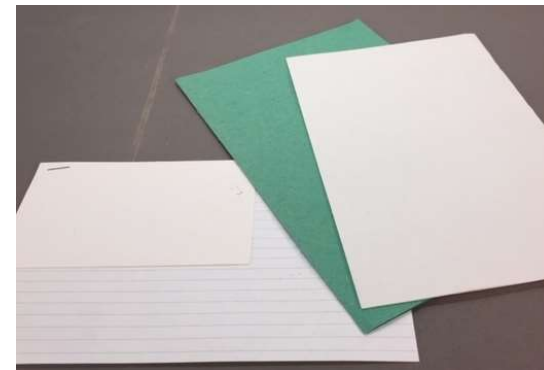


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## Model Building Materials

### 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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## Model Building Materials

### 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

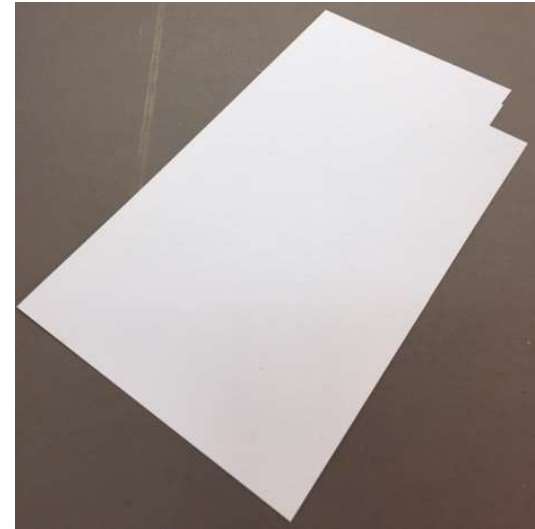


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## Model Building Materials

### 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

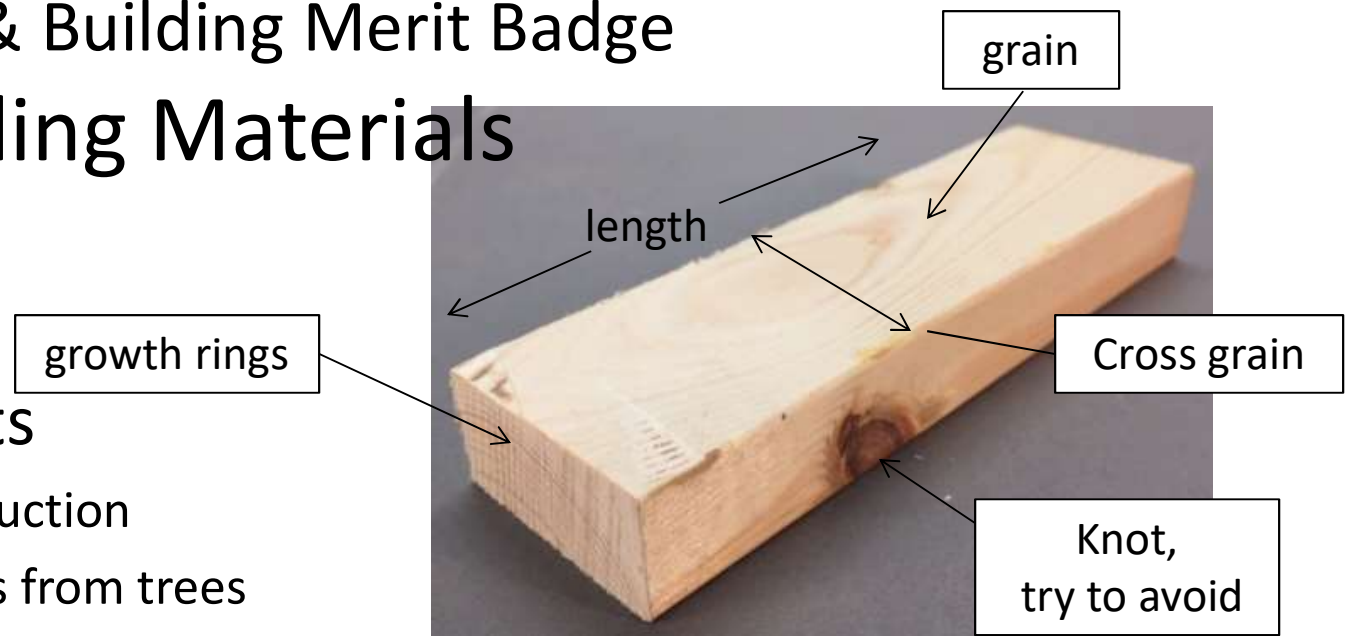


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## Model Building Materials

### 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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## Model Building Materials

### 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



# Model Design & Building Merit Badge

## Model Building Materials

### 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



# Model Design & Building Merit Badge

## Model Building Materials

### 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



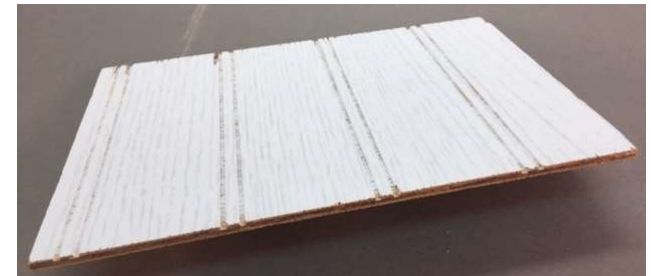


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## Model Building Materials

### 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



# Model Design & Building Merit Badge

## Model Building Materials

### Other materials

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





# Model Design & Building Merit Badge

## Model Building Materials

### Natural materials

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



# Model Design & Building Merit Badge

## Model Building Materials

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

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## Model Building Materials

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

<https://youtu.be/kp7ExAZL8i0>

Or

<https://youtu.be/vtoamtqDGDk>