
31. INVESTIGATING MATERIALS

A look through *Beginning Experiences in Architecture*, by George F. Trogler, is enough to prove that ANY material that can be stacked, bent, cut, twisted, or glued is appropriate for students' investigations. This "exercise" is simply a matter of providing materials and tools and encouraging students to "play" with them. Discussion should follow, during which students can describe the limits of the materials as well as their advantages. For example, a popsicle stick won't bend, but many of them can be stacked up; pipe cleaners are weak in compression (they bend) but are strong in tension and make good joints.

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32. USEFUL MATERIALS

Following is a list of easily available materials which are valuable for the study of their Inherent properties as well as for building model projects.

- **paper** of various weights can be bent, scored and folded to change its structural properties (see STRUCTURES).
- **graph paper** of different sized grids (scale transformations; precision in drawing rectangular shapes, as for floor plans).
- **brown craft paper** in rolls for backdrop murals, street grids.
- **sandpaper** simulates stucco or adobe when glued onto the walls of a model, or can be used as a ground cover for a desert environment; sand poured into paint gives a similar effect.
- **hair curlers** give the effect of an industrial landscape, as do a variety of miscellaneous objects (bottle caps, plastic packing materials, styrofoam forms, spool, bobbins, etc).
- **tin foil** has enough rigidity to stand alone if supported, bent, or twisted, and can be used to suggest aluminum sheeting, stainless steel, mirrors, etc.

- **corrugated cardboard** as an all-purpose building material. Large cartons can become rooms or buildings, or decorated and worn as costumes of architecture; strong standing structures can be made by "slotting".



The corrugation inside the cardboard demonstrates the structural power of the arch; have students pull a piece apart to see that it is nothing but three layers of paper, the middle layer being a series of arches which lend strength.



(Corrugated cardboard should be cut with exacto knives under close supervision. Have students score the cardboard first and make a deeper cut afterwards; cuts from the other side may be necessary.)

- **foam board** is a more expensive material, but worth the price for lightweight models.
- **cellophane** in many colors for stained glass windows or to illustrate color mixing.
- **plastic wrap** can cover a domed structure to turn it into a terrarium.
- **pipe cleaners** can be used for various joints or lashings, or to bend into scale figures and furniture.
- **acetate** used with special markers, to compare the inside and outside of a structure.
- **newspaper** for papier mache or to be rolled into newspaper logs, jointed with masking tape, for large trusses.
- **plaster gauze** fuses and strengthens weaker materials.
- **spools** (wood or styrofoam) can be stacked as columns, used as wheels, or used for model-sized furniture.
- **cloth or canvas** for teepees, tents, or temporary walls (hung from clotheslines).

- **sheets** hung up in the room create new environments in the classroom.
- **cardboard tubes** from toilet paper or paper towel rolls can be used to demonstrate the structural strength of the column and used in model constructions; easily decorated.
- **clay** can harden or be dried into facades or models; strengthen with popsicle sticks as a parallel to reinforced concrete; make small bricks.
- **dough** of flour, salt and water can be used as clay, or to revive the art of gingerbread houses.
- **styrofoam** can be used to demonstrate insulation; packing pieces or cups can be cut into decorative elements.
- **shoeboxes** can be used for shoebox diaries and then used to show a structural cut-away or turned into a model building or interior; they can be stacked into modular constructions, as a pueblo or hi-rise city (boxes of all shapes are useful).
- **egg cartons** illustrate the structural strength of the dome and can be used as such in models. Cardboard egg cartons covering walls or ceiling will absorb noise for a lesson in acoustics.
- **sugar cubes** can be stacked into a pyramid.
- **florist foam** is available in large pieces which are easily sawed or cut to make the wedge-shaped voussoirs and keystone in an arch.
- **toothpicks and small marshmallows** are a wonderful combination to let students investigate the structural properties of a truss.
- **plastic straws** can also be used for a truss framework, using bent pipe cleaner pieces as joints; straws can be lengthened by folding [lengthwise] and inserting the end of one into another; scotch tape can repair.
- **sticks** lashed with thread or string make structures used in "primitive" buildings; a frame can be covered with leaves, mud or clay.
- **popsicle sticks or tongue depressors** make sturdy frames.

- **children's blocks** are usually cut into shapes with strong architectural reference and often used that way in spontaneous play.
- **waxed cartons** can be cut and inserted into each other to make strong modular units for building projects or can be used singly as building units, as in rowhouses or skyscrapers. Cover with paper to decorate, as the waxy surface repels paint.
- **corks** are easily joined together to parallel the actual sectional construction of stone columns; they can be stacked and decorated as totem poles; they can be sliced and used as floor or wall material in models; cork's qualities (extremely light, absorbs shock and sound, attractive) make it a useful building material, and students will be interested to learn about its source in the bark of trees.
- **cotton** makes wonderful chimney smoke or clouds; cotton can be dirtied to indicate the effects of pollution.
- **string** and **wire** have innumerable uses, not only as structural supports but connected to dowels as power or telephone lines in a model community.
- **string** can also be turned into a tape measure by attaching pieces of tape at one foot intervals. Have students wind their tape measures around a spool (i.e. a toilet paper tube) to prevent hopeless tangles.
- **clotheslines** and **sheets** can be strung throughout a classroom to make new environments or tent structures. Sheets make temporary walls and make dramatic changes in the light, traffic, acoustics, and atmosphere of a room.
- **sponges** cut into different sizes make effective trees and shrubbery for landscaping.