

Activity Building with Many Materials

Focus: Children explore building materials, designs, and techniques as they build three-dimensional structures from a variety of materials.

Materials: See each subactivity below.

Setting: Individuals or small groups in the Building Center. Rotate materials for various subactivities over the course of the study.

Throughout this study, children will use the Building Center for free exploration as well as other, more structured building activities. (For information about setting up a Building Center, see “Preparing for the Constructions Study” on page 89.) Initially, set out materials for one building subactivity at a time and leave each subactivity set up for several days. This encourages children to become adept at working with the materials and allows them to sustain work on their building projects during several sessions. Continuing a project over several days gives children time to think through and revise their plans and, ultimately, build better constructions.

After children have used the materials for the various subactivities separately, you might choose to provide materials from different activities simultaneously. If you decide to offer a mix of building materials, set up a system for organizing the materials (for example, designating boxes for each type of material) and show children how you expect them to clean up the work area and store the materials. If possible, have an adult or highly organized child assist until routines are well established. If you choose to provide just one set of materials at a time, choose materials that reflect children’s preferences and offer them again if interest is high.

Encourage children to think before they build: What would they like to build? How would they like to build it? Ask some pertinent questions to help them plan their work, such as, What kind of building will it be? Is it tall or short? Does it have a roof? Windows? This exchange of information is an opportunity to begin talking about architects and their job, if you haven’t already. Spend time in the Building Center and talk with children about what they are trying and discovering as they work. Encourage children to collaborate on building structures, just as they do on projects in the block area.

Questions such as the following may enhance the building process and help children reflect on their experiences:

- What kind of structure (e.g., short, tall, round, skinny) and design does each type of material work well for?
- What kind does it not work well for?
- What is the best way to make the materials hold together (e.g., tape, glue, nails)?
- Are the materials they are using the same as or similar to any materials that are used in real structures?
- How do the materials compare with others children have built with during the study?
- How do the structures they are making remind them of real ones they have seen? Are their structures modeled after real buildings?

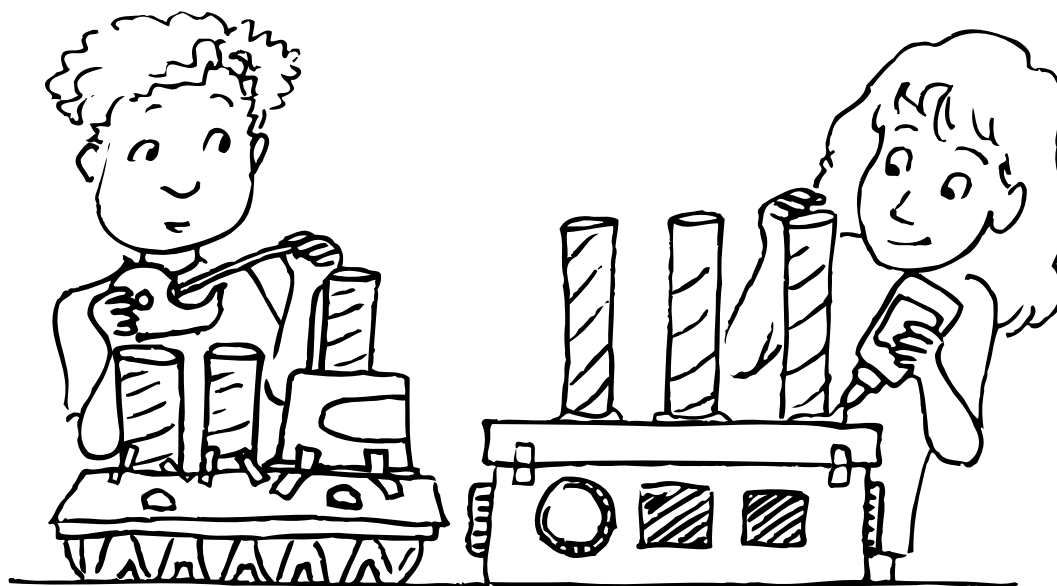
You can highlight some of these questions by giving children opportunities to share and talk about their constructions and the construction process. Encourage children to tell about any discoveries they make about building materials, designs, and techniques. Children can display their structures, along with an index card that tells the name of the “architect” and “builder” and any other informative facts they want to share.

TEACHER NOTE: Once children have had a chance to share their constructions, you will probably want to send these creations home to make space for new ones! Help children find fair ways to decide who should take home structures on which they have collaborated. Possibilities include: having each child take the structure home for a day or two; flipping a coin to decide who should keep the construction; collaborating on a replica; and taking a photograph for each child to keep, while dismantling the structure and reusing the materials. If asked, children are likely to come up with other workable solutions as well.

Scrap Materials (Scrounge Art)

Materials: “Recycled” (but clean) garbage, such as toilet paper or paper towel tubes, PVC tubing, craft foam, cardboard from boxes, shoe boxes, corks, string, scrap paper, egg cartons, plastic bottles and lids; glue; staples; brad fasteners; various kinds of tape (e.g., masking, wrapping, packing); and paint (optional).

Provide inviting scrap materials for building structures. Ask for donations if you don’t have a collection in the classroom already. (The family letter on page 93 includes a request for scrap materials.) The more varied shapes and sizes of materials you offer, the more unique the children’s structural designs will be. In addition, children will need to experiment with ways to fasten different materials together. Discuss the various techniques children use. Children will often invent a variety of creations with these materials, so you may need to focus their work on buildings for the purposes of this study. You might also allow children to paint their completed structures if you have the time and resources.

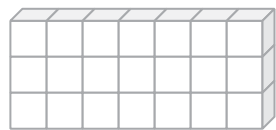


Sugar Cube Bricks

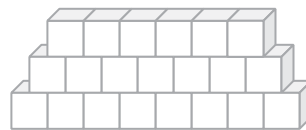
Materials: Sugar cubes, glue, and paper or cardboard (optional).

Invite children to build structures from sugar cubes held together with glue. As they build, encourage children to discuss different problems they encounter, such as how to make windows and doors. A great deal of shared problem solving can take place as they construct their buildings. Encourage children to compare the sugar cube “bricks” to real bricks. Mention that real brick buildings are held together by something called mortar, which works like the glue they are using. As children try to build different kinds of structures with the sugar cubes, help them make connections to the types of real structures that are (and are not) typically built of bricks. For example, bricks are not used for skyscrapers, since the lower walls would have to be extremely thick to support the weight of the building. However, bricks are frequently used for low, “boxy” structures, such as houses.

Children may want to experiment with using other materials, such as paper or cardboard, to make roofs for their sugar cube structures. Again, make comparisons between the models children are building and the roofs on real buildings. Focus the discussion on shapes as well as materials, such as a flat versus a slanted roof shape, and what materials would work best for each kind of shape. As an extension, suggest an experiment with how stability is enhanced if the edges of the “bricks” are staggered, rather than lined up on top of one another. Challenge children to find this pattern in real brick buildings as well.



edges aligned



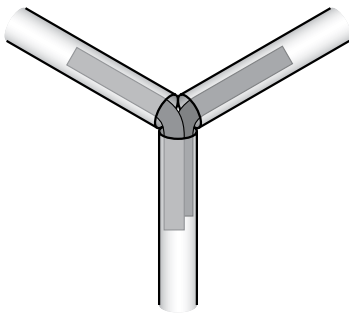
edges staggered

TEACHER NOTE: Consider sending home sugar cube structures soon after construction to avoid attracting insects and other unwanted creatures. If children agree, you might also dismantle them and recycle the “bricks.”

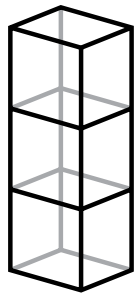
Clay

Materials: Clay, water, and pictures of adobe houses (optional).

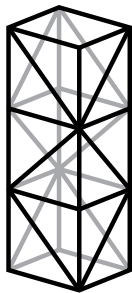
Provide clay for building clay structures. Some children might make clay bricks to build with. Others might try to shape larger pieces of clay into walls and roofs. They may discover that clay is an especially good medium for making curved structures. Talk about the different building techniques and results. Mention or show pictures of adobe houses, which are fashioned from a mixture of mud and straw; this material has properties that are similar to clay. (If you did “Building with Mud: Nests and Bricks” in the Dirt, Sand, and Water Study, refer back to that activity.) If you cannot bake the clay structures, let children know that dried clay is fragile and they will need to be careful when they take them home.



**joining straws
with pipe cleaners**



less strong



more strong

Paper, Sticks, and Straws

Materials: Small diameter straws*, cut in half; chenille craft wires* (pipe cleaners), cut in thirds; craft sticks or sticks from outdoors (optional); paper or cardboard; cellophane (optional); and tape and glue.

*Indicates items that are included with the curriculum

Put out paper, sticks, straws, and pipe cleaners. (Cut the straws in half and the pipe cleaners in thirds before setting them out.) Show children how to connect straws by inserting the ends of the pipe cleaners into the ends of the straws and bending the pipe cleaners to position the straws as desired.

As children work, you will probably see many come up with some sort of stick or straw “frame” onto which they add paper “walls” and “roofs” and cellophane “windows,” if those materials are available. Explain that this is how skyscrapers or other tall buildings are constructed—with a steel frame on which lightweight wall panels (often made of glass) are hung. Discuss how skyscrapers can’t be built like many shorter buildings, in which the walls hold up the structures, because the skyscraper’s walls would have to be too thick. You might want to encourage some children to try building frames with and without diagonal cross braces to compare their stability. (See “Marshmallow and Toothpick Constructions” for more information about the strength of triangles versus rectangles.)

Woodworking

+ SAFETY NOTE: Review safety procedures and rules prior to allowing children to do any woodworking. Also be sure that children are working under the close supervision of an adult at all times.

Materials: A variety of pre-cut wood, wooden dowel rods, medium-length nails (or glue), child-sized hammers (if using nails), screws, screwdrivers, safety goggles, and paint (optional).

If you have access to child-sized woodworking equipment and an adult to help children use it, invite children to design and build with wood. Most young children can hammer nails into pre-drilled holes. If nails and hammers are not possible, let children do some wood constructions using glue to hold parts together. (Many home improvement stores will donate unused pre-cut wood for classroom use.)

If you are unable to have open-ended woodworking projects, you might consider purchasing simple kits for building a birdhouse or dollhouse. If possible, divide the class into groups and have each group build their own house with the assistance of an adult. If you use one kit for the whole class, make sure there are enough steps involved to allow each child to do at least one assembly task. Conduct this project in your Building Center and rotate children through so that you or another adult can closely supervise the construction. Children may also enjoy painting the completed structures.

Connections

This activity connects with “Architecture Walk” and “Build Your Home.” Materials from “Marshmallow and Toothpick Constructions” can also be made available in the Building Center once that activity has been introduced.