

2007

Resources: Student Friendly Modeling Materials

Todd R. Kelley
University of Georgia

Jared Berrett

Follow this and additional works at: http://digitalcommons.usu.edu/ncete_publications

 Part of the [Engineering Education Commons](#)

Recommended Citation

Kelley, T.R., & Berrett, J. (2007). Resources: Student friendly modeling materials, *Technology and Children*, 12(2), 12-13.

This Article is brought to you for free and open access by the Research at DigitalCommons@USU. It has been accepted for inclusion in Publications by an authorized administrator of DigitalCommons@USU. For more information, please contact dylan.burns@usu.edu.



RESOURCES

student-friendly modeling materials

introduction

If your preparations for a new school year began anything like ours, you were probably scrambling to gather supplies and hoped you had most everything you needed. Our experiences tell us that, no matter how diligently we try to gather just the right types of materials, we often find ourselves running late on the way home after school several times a week because we need to pick up some project supplies for the next day. Teaching technology and introducing projects in the classroom can complicate a typical curriculum, but the pay-off is worth it. The advice in this column cannot ensure the elimination of those last-minute runs to the store, but will hopefully help you select some appropriate modeling materials that are kid-friendly and cost-effective.

modeling

Students get a powerful learning experience when they see their design ideas come to life through the construction of a physical model. Model making helps young learners develop their fine motor skills and can appeal to those tactile learners. Models help professional designers understand the abilities and functionality of a specific design idea. There are a number of different types of models, which are often created during the design phase of a project. These include

image models, rough mock-up models, presentation models, and prototypes. Any of these types of models can be appropriate for the classroom.

materials

Regardless of the model type you assign to your students, the materials are important to the construction of the students' projects. Many great materials (such as paper, glues, rubber bands, paper clips, tacks, tape, etc.) are usually already stocked in most elementary classrooms. Here we present to you just a few other materials that may allow your students to create models and foster their creativity at the same time.

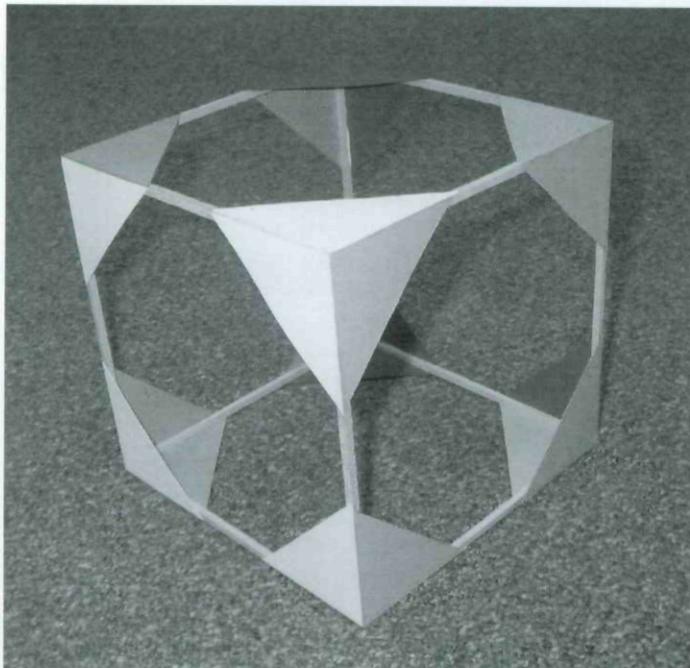
Card stock is a very user-friendly material that can be manipulated into many different shapes. It is a thick, sturdy

by Todd Kelley
and Jared Berrett

paper that comes in a variety of sizes and thicknesses. In 2000, one of the authors (Kelley) traveled to England to study the teaching of Design & Technology in the elementary grades. He was amazed to see many structures (like the cube in the photo below) built using card stock gusset plates to strengthen typically weak materials such as balsa wood or round stock. You can even purchase pre-cut card-stock parts—such as laser-cut wheels, girders, and gusset plates, all made of card stock paper—from technology vendors. However, we prefer that the students make their own.

Clay is another great modeling tool for a variety of industries and classrooms.

However, not all clay has the same characteristics; some clay is not kid-friendly and may be harmful to their health or your classroom if not used properly. Some modeling clays are oil-based, or wax-based, often called Plasticine. Such clays are the most recommended based on their slow drying property. (An example of a model made from this clay can be seen on the next page.) Other high-performing clays for the money include the paper clay that can sanded after a short drying period and polymer clays that can be dried in any home oven or toaster oven for 30 minutes at 265 F (130 C). A tip for using clay for larger projects is to build around a solid core material



Cube model made by Eduard Locke

such as a cardboard box or block of wood (this will consume less clay). Keep in mind that regular art clay dries quickly and shrinks dramatically, so a solid core cannot be used.

Cable or zips ties are not necessarily a material, but are extremely useful as fasteners to help hold odd-shaped materials together. Cable ties are very strong and can be easily installed to hold together a variety of modeling materials. Students in our technology classes often used cable ties to secure oral syringes to make hydraulically controlled robot prototypes. Cable ties were a perfect fastener to secure the curved, smooth surface of an oral syringe, an object difficult to fasten with tape or glue. Most hardware stores and building supply centers sell a variety pack of cable ties of various colors and sizes in the electrical section of the store.

Other typical materials that should be in every elementary technology classroom include some fasteners/bolts, a little bit of sheet material including perhaps 1/4" plywood, 1/8" hardpress board (Masonite), or a little acrylic (plexiglass). Cardboard is fantastic and is usually a free modeling material. It can be obtained in large quantities over time if you contact a local building supplier and ask them to save large scraps used for shipping purposes. Most dry cleaners use cardboard to bolster cleaned shirts, and they are also an excellent source of cardboard material. A power drill, a square, handsaws, snips, metal files, and drill bits should be available to do some minor materials processing as well. Most recently, many manufacturers create tools in kid sizes that are ergonomically designed to fit little hands.

Manufactured Modeling Kits

LEGOs®, Erector Sets, Tinkertoys, and

K'NEX are just a few of the commercially manufactured building kits on the market today. Some may perceive these as toys as opposed to modeling materials. However, for a quick robot, structure, or rough mock-up model, these building kits

are an excellent modeling resource. Today many deluxe building kits come with motors, sensors, and computer controls, allowing students to build fully functional prototypes. The best part of using these types of building kits is that students are comfortable using them, so much so that they often feel like they are playing, while in reality a lot of learning is taking place.

Natural resources available right outside your classroom can also be very powerful and useful. From little pebbles for hydroponics, to tree branches for mock fencing or trebuchets, the world can be our classroom. How about the trash? Those one- or two-liter bottles make super rockets or terrariums. Paper can be recycled and made into parchment on which a Chinese haiku can be written. The possibilities are endless.

conclusion

Model making is a very powerful learning and teaching tool. Kids are naturally motivated to build things; these activities provide a scaffold for further learning. Numbers, counting, and multiplication,



for instance, can easily be woven into a unit using LEGOs®, motors, and gears to propel a small car. How will smaller gears perform compared to larger gears? Students can graph data from their observations of gear performance, and describe the differences. Overcoming the fear of materials and working with their hands can also be a reward in itself for many kids. We hope that you will consider using these and other materials in your classroom as resources to encourage student learning of technology and engineering and to benefit the future roles that your young students may play. 💡

Todd Kelley is a Ph.D. graduate student at the University of Georgia in the department of Workforce Education, Leadership, and Social Foundations and a fellow with the National Center for Technology Education. He can be reached at kelley30@uga.edu.

Jared Berrett has recently returned full time to the public school classroom from being a professor of technology education at Brigham Young University. He can be reached at jberrett@sanjuanschools.org.

Copyright of Technology & Children is the property of International Technology Education Association and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.