Close the Lid

THE BASICS	THE TOOLBOX
 Grade Level: 2-12  Estimated Time: 20 min.	• Scissors • Tape • Close the Lid pattern on page 132 • Construction paper • 2-cm. wooden cubes – 24 per student

EDUCATION STANDARDS	**Geometry Content Math Standard:** Using visualization and spatial reasoning to solve problems and analyze characteristics of three-dimensional geometric shapes to understand geometric relationships.
SAFETY CONCERNS	Make sure younger students do not put the blocks in their mouths.
FOR KIDS WITH DISABILITIES	Visually-impaired students may need time to become familiar with the blocks before and after they are taped together. Mobility-impaired students may need proportionally larger pieces.

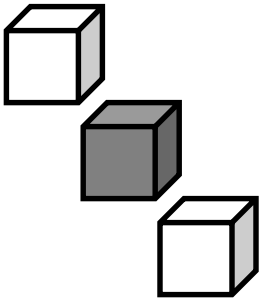
What To Do

Educational Objective:

To practice spatial reasoning and geometric reasoning in order to solve a problem.

What to Do:

- Copy the "Close the Lid" pattern on page 124 onto colored construction paper.
- Each student will need one copy of the "Close the Lid" pattern, scissors, tape, and twenty-four 2-centimeter wooden cubes.



Questions to Ask Students As They Do This Activity:

- What strategies did you find most helpful as you tried to "Close the Lid" or put the taped blocks inside the cube?
- Does it help to put the taped blocks together inside or outside of the box?
- Do you think that other shapes can be put together in order to make a cube?

Why It Happens:

Using three-dimensional cubes, students learn that the cubes can be put together to form different shapes and, in this case, a larger cube by completing the puzzle. Through building and manipulating representations of three-dimensional objects, children develop their spatial visualization skills, which is an important aspect of geometric thinking. Geometric ideas are useful in representing and solving problems in other areas of mathematics and in real-world situations.

Web Sites

- **Exploring Geometric Solids**
  http://illuminations.nctm.org/imath/3-5/GeometricSolids/index.html (Grades 3-5)
- **Geometry in Art**
  http://www.geom.umn.edu/~demo5337/Group4/ (Grades 7-12)

Software

- **Super Factory**
  Sunburst Technology, 1996.
  (Grades 6-12)
- **Shapes Within Shapes**
  Tenth Planet, 1996
  (Grades 2-5)

Reading Room

- Hewitt, Sally. **Puzzles**. Raintree Steck-Vaughn, 1996. (Grades K-4)
- Hewitt, Sally. **Shapes**. Raintree Steck-Vaughn, 1996. (Grades K-4)
- VanCleave, Janice. **Janice VanCleave's Geometry for Every Kid: Easy Activities That Make Learning Fun**. Wiley, 1994. (Grades 3-12)

Career Connections

The art of making and breaking secret codes is called cryptography. Cryptographers can work for government agencies, such as the CIA, on matters concerning our national defense or for cable television and satellite companies, preventing people from obtaining services illegally.

Close The Lid

- Using scissors, cut along the **solid** lines.
- Then, fold along the **dashed** lines to make a box.
- Tape the edges of the box together.
- **Do not tape the lid closed.**
- Next, make a block by taping together four 2-centimeter wooden cubes as shown in Figure 1 on the right-hand side of the page.
- Make six of these blocks total.
- Put the six blocks into the larger box so that you can close the lid.

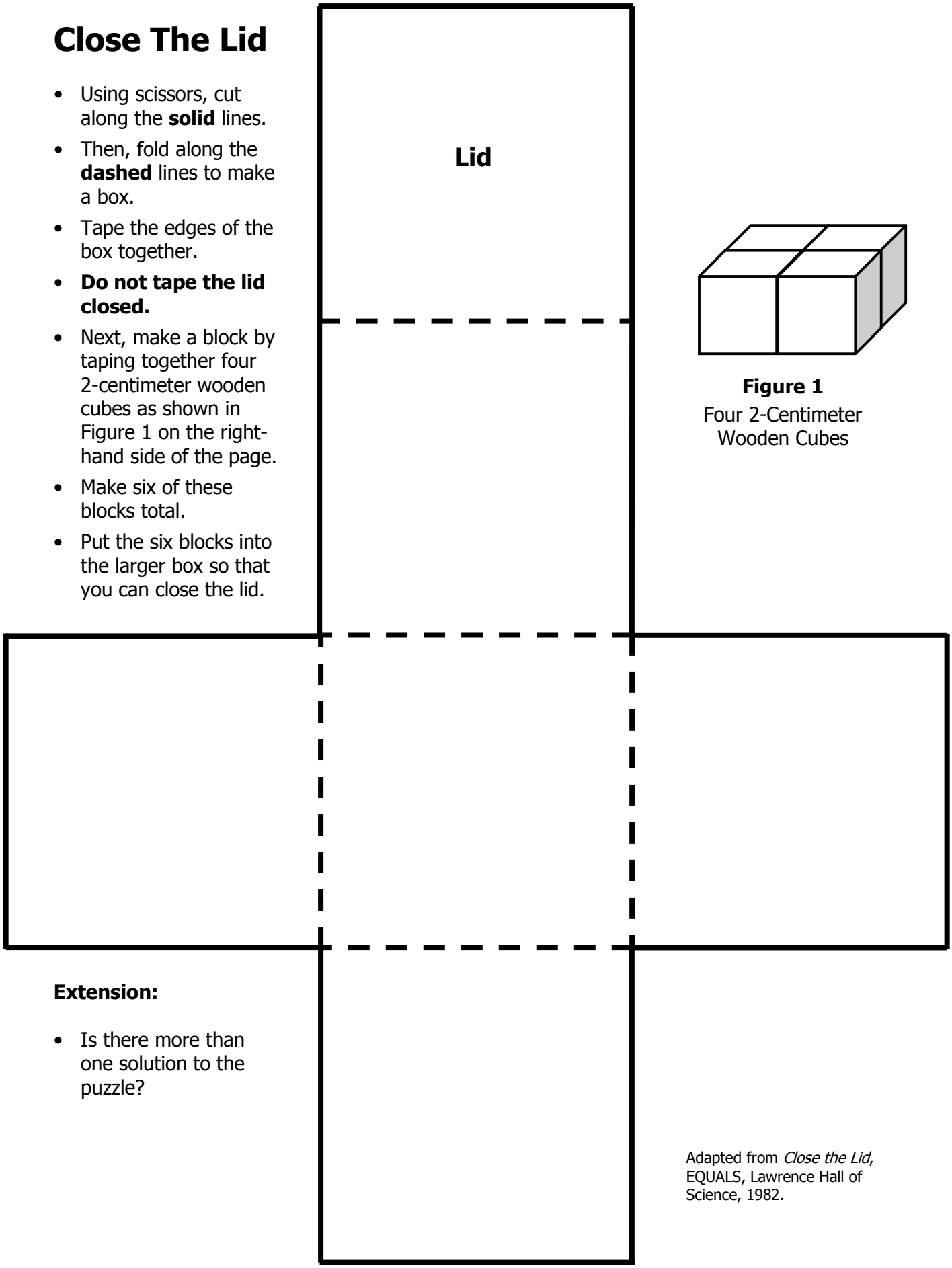


Figure 1
Four 2-Centimeter Wooden Cubes

Extension:

- Is there more than one solution to the puzzle?

Adapted from *Close the Lid*, EQUALS, Lawrence Hall of Science, 1982.