TIPS for Manipulatives
CONNECTING CUBES

What are they?

Interlocking cubes are available in different sizes and different colours. In a 1-cm cube set, each cube has a mass of 1 g (which is useful for mass explorations). However the larger 2-cm cubes are easier for students to handle. Both sizes of cubes can connect on all 6 sides.

How do they help students?

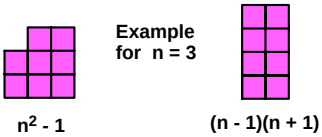
Interlocking cubes help students develop spatial sense. They are also used to develop understanding of number and measurement concepts. The variety of colours allows cubes to be used in probability experiments. Students can use cubes to create, identify and extend patterns. The patterns can be used to develop algebraic models.

How many are recommended?

Students usually work in pairs or small groups when using connecting cubes. A class set of about 700 to 1000 pieces will allow students enough cubes to do a variety of activities. When interlocking cubes are first introduced to the class, allow students time to explore. When students are finished an activity consider instructing students to connect the cubes in "trains" of 10 linked cubes. This will facilitate collection after an activity, storage between activities, and preparation for the next activity.

What are some sample activities?

1. Build a cube train. What colour is the 200th cube in the train?
2. Represent 347 in expanded form using single cubes, trains of 10 cubes, and large "squares" of 100 cubes.
3. Create a model of one quilting square (or floor tile) using 9 cubes of different colours. If 4 squares are used to form one larger square, how many different patterns can be formed?
4. How many different ways can you illustrate 3/4? (or a decimal, or a percent)
5. Use two different colours of cubes to model integer questions. (N.B. the number of cubes represents size and the colour of cubes represents sign)
6. Design a sequence of patterns. Analyze the pattern and determine an attribute of the 100th term in the sequence (connect to algebraic modeling).
7. Explore relationships between perimeter and area, and between surface area and volume.
8. Build a structure then draw the top, front and side views (or draw the structure on isometric paper).
9. Put different coloured cubes into a paper bag. Determine the probability of choosing a yellow cube.
10. Let "*b*" represent the mass of one cube. Determine representations for the masses of different structures.
11. Build an object out of interlocking cubes. Write instructions for making the object. Trade instructions with another group (N.B. focus is on communication).
12. Create different "staircase" models to investigate slope.
13. Use connecting cubes to create histograms or frequency charts.
14. Determine how many different structures can be built with 4 cubes.
15. Use cubes to model algebraic rules. Example: $n^2 - 1 = (n - 1)(n + 1)$
16. Use cube links to model different ways to decompose shapes to find area and perimeter (see TIPS: Section 2 – Developing Perimeter and Area Formulas, page 12)



Are there any recommended websites?

www.edu.gov.on.ca/eng/document/curricul/elementary/exemplars/math/grade8/patternt.pdf - Grade 8 Exemplar
http://matti.usu.edu/nlvm/applets/controller/query/query.htm?qt=blocks - interactive (Space Blocks, Alg. 6-8)
www.tenet.edu/teks/math/clarifying/clgrd5towers.pdf - prime factorization
http://www.pwcs.edu/i-tech/TLCF/Geometryintheworld/studentjpage_files/studentjpage.htm#intro - Webquest
http://illuminations.nctm.org/mathlets/isometric/ - interactive isometric drawing tool
www.otrnet.com.au/IntegratedMathsModules/B06/B06ApplicationF.pdf – box design activity
http://www.illuminations.nctm.org/imath/6-8/isometric/index.html - interactive activities for spatial reasoning