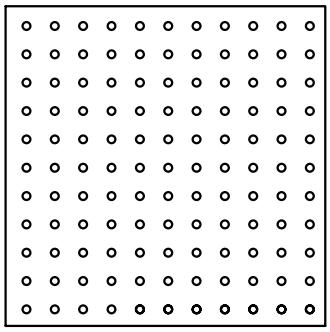
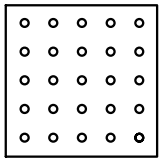
TIPS for Manipulatives
GEOBOARDS





Rubber bands

What are they?

Geoboards are grids of pegs that can hold rubber bands in position. They were invented by the English mathematician Caleb Gattegno (1911-1988). Geoboards are now available in a variety of sizes, styles, and colours. A preferred model is the transparent geoboard that can be placed on an overhead projector to facilitate sharing of student observations and conclusions. Many geoboard activities are available for both the 5 pin x 5 pin and 11 pin x 11 pin geoboard sizes.

How do they help students?

Geoboards are particularly useful in developing conceptual understanding of area and perimeter. However, they can be used to explore mathematics from any of the curriculum strands. A wide array of resources including the Ontario Grade 7/8 Exemplars, are available to support the use of this manipulative. Resources include engaging activities involving fractions, the Pythagorean theorem, tessellations, transformations and patterning. When students work together using geoboards, they have opportunities to improve communication skills, share ideas, and use mathematical vocabulary.

How many are recommended?

Geoboard activities are often done with pairs of students so, in most cases one geoboard per pair of students is sufficient. Geoboards can be constructed using wood and nails. Blackline masters of geoboards can be used to record solutions or for home extensions. When geoboards are first introduced to students, point out obvious safety rules then give students some time to experiment and explore.

What are some sample activities?

1. Construct a design for a quilt square or a stained glass window. Analyze the design. Enlarge or reduce the design. Compare your design with another student's design. (What's the same? What's different?)
2. Construct two three-sided (or four-sided) figures that are congruent (or similar).
3. Determine how many different sizes of squares (or equilateral triangles) can be constructed on a 5-pin x 5-pin geoboard. How many can be constructed on a 20-pin by 20-pin geoboard?
4. Construct two pentagons that have the same area but different perimeter (or vice-versa).
5. Construct a symmetrical design.
6. Construct a "diagonal" segment. Now construct a line segment that is parallel to the first segment. Determine the lengths and slopes of both segments.
7. Construct a line segment whose length has a measure between 3 and 4 units (or a given slope).
8. Choose any two pegs on the geoboard and determine different paths from the first peg to the second. Record solutions and determine which path is the longest and which is the shortest.
9. Create a 3-sided (or 4-sided) shape. Compare with a partner. What is the same? What is different?
10. Create a shape. Determine its area in more than one way.
11. Design a shape on one half of the geoboard. Construct its reflection.
12. Make a figure that has an area of 4 and a perimeter of 10.
13. Determine the maximum area that can be enclosed on an 11-pin by 11-pin geoboard if the perimeter is 25 units.
14. Determine different ways to divide the geoboard into 4 equal areas.
15. Use rubber bands to divide the geoboard into different areas. Express each area as a fraction (decimal, percent) of the whole area.

Are there any recommended websites?

http://standards.nctm.org/document/eexamples/chap4/4.2/ - interactive geoboard activities (NCTM)
http://matti.usu.edu/nlvm/nav/frames_asid_125_g_1_t_3.html - virtual geoboard
http://mathforum.org/trscavo/geoboards/contents.html - *Geoboards in the Classroom*
http://mathforum.org/trscavo/geoboards/dotpaper.html - dot paper