

HOW DO I USE GEOBOARDS?

Some lesson ideas to utilize these EXCELLENT tools

Presented by:

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Tip #1

Geoboards are ideal for geometry lessons and work well when paired with other manipulatives

Tip #2

Use LARGE rubber bands or craft fabric loops to prevent snapping bands and long clean-up.

Tip #3

BE CREATIVE and allow your students to experiment!!!

Tip #4

Use virtual geoboards, check out this site:

<http://nlvm.vsu.edu/en/nav/vlibrary.html>

Tip #5

Geoboard dot (Geodot) paper with 1 board (BLM 28) or 4 (BLM29) is ideal to record work and is available at www.ablongman.com/vandewalleseries

Tip #6

FYI: Clear geoboards are overhead geoboards and geobands are rubber bands

Geoboard-Unifix Patterns

Skills: Patterning, Matching

Materials: Geoboards, Geobands, Unifix Cubes, Geoboard-Unifix Pattern Cards (cards with patterns)

Students copy patterns of cubes onto 2 geoboards placed side by side and then extend the pattern. (Extend this activity and allow students to use 4 boards.) Students can draw conclusions, notice additional patterns, and describe those in small groups. (Students complete pattern on the board top left to bottom right.)

Geoboard Sequences

Skills: Patterning, Reasoning deductively, Analyzing patterns

Materials: Geoboards, Geobands, Geoboard Sequence Cards (Geodot paper with $\frac{1}{2}$ or $\frac{1}{4}$ of a design)

Children make the partial design from the card on the geoboard and complete it by extending the design. Students discuss the design, how they completed it, and practice using mathematical vocabulary.

Make-It Symmetrical

Skills: Using mathematical vocabulary (Symmetrical, Asymmetrical), Reasoning deductively

Materials: Geodot paper, Geoboards, Geobands

Ask the students to divide their geoboards in half by placing a rubber band vertically, horizontally or diagonally on the geoboard. Students will work in pairs. One student makes a design on one half of the geoboard and the other student must complete the design on the opposite side of the geoboard so that the TOTAL design is symmetrical. Have each student record the design by drawing a line on his/her geodot paper showing the line of symmetry. Record the symmetrical design on the geodot paper. Extend this activity and make shapes with two or three lines of symmetry.

Geoboard Numerals

Skills: Sequencing, Numeral writing, Recognizing number words

Materials: Geoboards, Geobands, geodot paper with numerals, number word cards (number words on index cards)

Students reference the geodot paper and create numerals on geoboards. Then, students can match the number word card. This activity can be paired with a listening center and the Dr. Jean Sing to Learn CD, #9 Numeral Writing Song (She describes the process of creating each numeral in the song to reinforce vocabulary for ESOL students)

Geoboard Sorting Game

Skills: Sorting, Comparing similarities/differences, Identifying shapes

Materials: Geoboards, Geobands

Students use one geoband to make a specific shape stated by the teacher on their geoboards. Then sort the geoboards by different attributes: color, size, orientation, etc. Repeat this activity several times and have students create different shapes (rectangles, triangles, zigzags, houses, diamonds, etc.) or patterns and sort. Eventually, create cards with different attributes to allow students work independently. (Students may even take the geoboards on a shape walk, create the shape they see, and sort them upon return to the room!)

Geoboard Paths

Skills: Identifying possibilities, Comparing similarities/differences

Materials: Geoboards, Geobands, Unifix Cubes, Geodot Paper (optional)

Children put a red cube (or color of your choice) to signal the end point in the bottom right hand corner and a green cube (or color of your choice) to signal the starting point in the top left hand corner. (Or place cubes anywhere.) Students then trace a path to get from the "green house" to the "red house." When done they try to find other ways, trying to find as many paths as possible. Students may record their paths on geodot paper and/or sort them. These recordings make a good class book. When children tire then change the positioning of the cubes.

Geoboard Arrow Games

Skills: Comparing Similarities/Differences, Finding all possibilities, Following Directions

Materials: Geoboards, Geobands, Direction cards with arrows, Geodot Paper (optional)

Students use one direction card and try to determine all possible ways to follow one set of directions. Students may record their results on geodot paper and create a book of possibilities.

Geoboards

Skills: Counting, 1 to 1 correspondence, Invariance of number

Materials: Geoboards, Geobands, blank squares of paper that fit between nails (~1 ¼ inch)

Several students work together exploring a predetermined quantity. Students attempt to find lots of different arrangements of paper squares. Teachers may create rules to guide students such as all squares must be placed in adjacent boxes or must not touch each other, etc. depending on the ability level of students. When students become proficient, you may extend this activity to allow students to squares with numerals, number words, addition facts, equivalent fractions, etc.

Geoboard Patterning Squares

Skills: Patterns, Numbers

Materials: Geoboards, Geobands, blank squares of paper that fit between nails (~1 ¼ inch)

Children work to create a pattern placing the squares of paper between the nails and recording a repeating or growing pattern. Allow students to notice the patterns and even color the squares to see the pattern more clearly.

Geoboard Number Patterns

Skills: Patterning, Comparing, Counting, Repeated Addition/Multiplication

Materials: Geoboards, Unifix Cubes

Two students work cooperatively on 4 geoboards arranged in a square. The children choose a number to explore and start counting in the top left of board (as you would read). Students then count quietly to their designated number repeatedly placing a unifix cube on their board in a pattern each time. Students then count again and this time they place a cube onto the board only on the number they are exploring. Finally, when finished students reflect on the pattern and confer about the rows, columns, and diagonals. This activity extends easily into repeated addition and introductory multiplication.

Geoboard Designs

Skills: Counting, Addition, Positional words

Materials: Geoboards, Geobands, Unifix Cubes, Recording sheet (attached)

Students make a shape on the geoboard. They then cover the nails inside the shape with one color cube and those outside with a different color. They record the number of total cubes inside and outside on the recording sheet. Then complete the resulting number sentence. As the children's skills increase use multiple geoboards to create larger numbers.

Geoboard Nails

Skills: Problem Solving, Counting, Comparing, Patterning

Materials: Geoboards, Geodot paper, rulers, unifix cubes

Children count the number of nails along successive diagonals OR rows, etc. and use the ruler to record the pattern on the paper. Students then discuss patterns and the total numbers. They may record these patterns and discoveries on their paper. Repeat this activity with yardstick or meter stick and/or multiple geoboards arranged in squares, etc.

Geoboard Procedural Books

Skills: Explanation, Using mathematical language, Recognizing and identifying shapes

Materials: Geoboards, Geodot paper, white paper, pencils, stapler

Students begin by free exploring the geoboards and create a picture, design, or pattern of their choosing. Students then must explain step by step in how to make their design in a "how to book" format. When completed other students may attempt to create the same design following the directions as written.

Yes/No Game

Skills: Problem Solving, Characteristics of Shapes, Sorting

Materials: Area to showcase the shapes that are made, Geodot paper, Geoboards, Geobands

Ask the students to make a 4 sided shape on their geoboards. Decide on a characteristic that you are going to say YES for (for instance: rectangles). Ask some students to come up to the board and place their shapes under YES if they have made rectangles. Ask some students who have not made rectangles to place their shapes under NO. Ask the students to figure out what are the common characteristics under YES and why do they think that those shapes are under YES. How are the shapes under YES alike? How are the shapes under NO different from the shapes under YES? Why are the shapes under NO in that category? This activity is ideal for geometric vocabulary terms, such as: sets of parallel lines, regular/irregular shapes, quadrilaterals, types of triangles, congruent, similar, etc.).

Make It Change It

Skills: Mathematical vocabulary, Communicating mathematical ideas, Composing and decomposing shapes

Materials: Geodot paper to draw each shape and change shape

Tell the students to make a shape on the geoboard. Then tell them to change it to a new shape. Ask them to explain how the shape changed or what happened to change it. (Label each shape on geodot paper) For example, make a triangle, then change it to a square OR make a small rectangle, then change it into a larger rectangle OR make a square, then transform it into a rectangle OR build a rectangle, then alter it into 2 triangles.

Mind Stretchers

Skills: Mathematical vocabulary, Problem solving, Positional Words

Materials: Geoboards, Geobands, Geodot paper (optional)

Give students an open-ended task and then compare the students' interpretations. For example, students can build 2 rectangles that overlap; 2 squares that are different sizes; a triangle with a triangle inside it; a square with sides that touch at least 9 pegs; a triangle with 5 pegs inside of it; a shape with 4 sides and 2 pegs inside; a triangle with only one peg inside; 3 rectangles, each one bigger than before; 2 triangles that share a side, etc.

Farm Fences (From SuperSource Grades K-2)

Skills: Discriminate among shapes, Counting, Identifying polygons, Sorting

Materials: Geodot paper, Geoboards, Geobands, Area to showcase work

Ask the students to use one rubber band to make a "fence" (or a closed shape). The "fence" can be any shape as long as it would keep animals in and has an empty space inside so animals would have room to move around. Students count the number of sides in their shape. Compare the fences and notice the differences. Students may record their "fences" on geodot paper. If not, decide how to make each of them have a different number of sides. Then draw all of the fences on geodot paper.

Label the top of the board with number of sides on the polygons. Children can post their design in the appropriate group. Define each type of polygon and allow students to label their "fence." Discuss why a shape can have 4-6 sides and look different from others with the same number of sides. Compare the "fences" in each category. Sort shapes in a variety of ways, such as types of angles, etc.

Extend this activity with a writing prompt: If you had an imaginary animal called a "mathasaurus" and why would this "fence" be best?

Inside Triangles (From SuperSource Grades K-2)

Skills: Recognize triangles that differ in size and shape, Compare shapes

Materials: Geodot paper, Geoboards, Geobands, Clear Geoboard, Overhead Projector, Area to showcase work

Show the students a geoboard on the overhead projector and make a triangle that has three nails inside. Have the students count the nails. Partner students and instruct each to make a triangle with no pegs inside using one geoband. They will compare the two triangles, ensure they are different, and copy them onto geodot paper. If they are not different, continue to work until they make a different triangle. Continue in this manner with 1 nail inside, then 2, and 3 nails inside.

Have students cut out **one** of each type of triangles and post them on the board with the following headings: no pegs, 1 peg, 2 pegs, 3 pegs. Only DIFFERENT triangles will be posted on the board, each time one is added confer about the similarities and differences. Encourage children to interpret and draw conclusions about the display.

Identify Plane Shapes (From Hands-On Standards K-2)

Skills: Identify shapes, Identify characteristics of Shapes, Classify shapes

Materials: Geoboards, Geobands, white paper to record shapes

Instruct the students to make different shapes on their geoboards. For example, make a shape with 4 straight sides that has four corners and all of the sides are equal length. (Students can count the number of nails on each side to ensure equal lengths.) Or make a shape with 3 sides and 3 corners. Or make a shape with 4 sides where opposite sides are equal and there are four right angles. Or compare and contrast squares and rectangles.

Extend this activity and have each student draw a picture with overlapping shapes. Have them count and state how many of each shape are included in their picture.

Identify Congruent/Similar Shapes (From Hands-On Standards K-2)

Skills: Identifying shapes, Classify shapes, Recognize congruent shapes and similar shapes

Materials: Geoboards, Geobands, Clear Geoboard, Overhead Projector

Make a shape on an overhead geoboard. Students should create a congruent shape on their geoboards. Place the students' geoboards on the overhead geoboard to make sure it is congruent. Continue this activity with other shapes.

Make a shape on an overhead geoboard. Ask the students to create a similar shape on their geoboards. Place the students' geoboards on your overhead geoboard to make sure it is similar. Continue this activity with more shapes.

Pair this activity with tangrams or attribute blocks to show congruent and similar shapes.

Exploring Perimeter (From Hands-On Standards K-2)

Skills: Addition, Measuring, Spatial Visualization

Materials: Geoboards, Geobands, Geodot paper, Overhead Geoboard, Overhead Projector

Place one geoband on an overhead geoboard connecting 2 nails. Notify students one nail to the next is equal to one unit. Ask the students to make a square that has one unit on each side. Ask them to continue making squares with 2 units on each side, 3 units, etc. Each time add up the sides and state the total length of all sides ($2+2+2+2=8$, etc.) Continue this activity with rectangles. Students can individually create shapes with different perimeters on their geoboards and record on geodot paper. The students should record the addition sentence and the total each time. For example, make a rectangle with 3 units on two sides and 1 unit on the other two sides ($3+3+1+1=8$).

Identify Simple Fractions (From Hands-On Standards K-2)

Skills: Identify and name simple fractions, Solve word problems, Reason mathematically

Materials: Geoboards, Geodot paper, Geobands.

Give the student the following word problem: It was raining outside so the class had to play in the gym for recess. The teacher asked the class to divide the gym in half, one side for basketball and one side for jump rope. How could students divide the gym? (Students should make the largest square on the geoboards (4 units on each side) using a large geoband, this represents the gym.) Show all possible ways to divide the gym in half on your geoboards and record each on Geodot paper.

Change the problem slightly and allow students to attempt it again. Ask students how they might divide the gym if there were 3 activities to play, 4, etc. Remind students that each part must be equal!

Identify Right, Acute and Obtuse Angles

Skills: Identify Angles, Classify Angles

Materials: Geoboards, Geobands, Geodot paper, Overhead Geoboard, Overhead

Review types of angles and have students look for examples. Allow students to create two examples of each type of angle on their geoboards. Show children an example of the right angle on the overhead first and make a one unit square inside the show that it is a right angle---just as in textbooks and on standardized tests. Instruct students to begin with a right angle and then make an obtuse angle, they will move the rubber bands away from each other so that it is greater than a right angle. If students want to make an acute angle, start with a right angle and move the rubber bands closer together to make an angle smaller than a right angle. The students will record two different examples of each type of angle on geodot paper and label each.

Extend this activity and have students build different polygons on the geoboard and label the angles in each shape. For example, make a trapezoid that looks like the pattern block trapezoid and label the obtuse and acute angles (2 obtuse and 2 acute). Question students about the angles in squares and rectangles and ask students if they can make shapes with specific angles.

