**GEOBOARD NOTES ACTIVITIES 1 AND 2 AND REFERENCES**

*All the activities can be used in school and adapted for learners in different grades according to the learning objectives and time available.*

\***Teaching ideas**. (1) With one geoboard for demonstration you will be able to use many of the ideas in these notes in your teaching. If learners do not have geoboards they can be asked to do the same tasks by joining points on dotty grids.

(2) Make a class set of geoboards so that learners can share one between two, work in pairs or small groups, then compare findings with other groups.

(3) Use and App <https://www.mathlearningcenter.org/apps/geoboard>

A group of women working on a project

AI-generated content may be incorrect.**MAKING GEOBOARDS**

Make your own geoboard. Use a paper square with the grid marked so that you knock in your nails accurately at the points of the grid.

Maybe this could be a project for a Design Technology class.

*A square wooden board with small silver pins

AI-generated content may be incorrect.*

8 by 8 commercially produced

geoboard with nails and rubber bands

***A wood square with string around it

AI-generated content may be incorrect.A wood square with string and nails

AI-generated content may be incorrect.A string art on a wood surface

AI-generated content may be incorrect.***

Three circular 18 pin geoboards showing multiples of 4, 5 and 7.

See Paths to the Stars

<https://aiminghigh.aimssec.ac.za/path-to-the-stars/>

**ACTIVITY 1 TRIANGLES ON A 25 PIN GEOBOARD**

***DO*** Make a **triangle** on your geoboard.

***TALK*** Look at the geoboards of the people around you.

Are their triangles the same as yours?  
Try to make a different triangle from theirs so that your group can see many different triangles.  
What is the same? What is different?

Can you sort them into sets of similar triangles and sets of congruent triangles?

***RECORD*** Draw some of the different triangles on square dotty paper.

To cut down this task just draw ONE triangle from each set of congruent triangles.

Note the properties of each triangle :–

Is it… Right-angled?   
Isosceles (two sides equal)?  
Scalene(unequal sides)?

If you make a triangle that looks almost equilateral measure the edges. Is it equilateral?

What is its area?

What are its symmetries?

All the right angled isosceles triangles are enlargements of the small red triangle (number 1). How much bigger are they, that is, what are the scale factors of the enlargements?

***How can we extend this activity?***

***Example: Set of 6 right angled isosceles triangles***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| All similar to each other  All enlargements of the red triangle no. 1  Rt angeld isosceles Triangles set6All have line symmetry  1  2  1  4  3  5  6 | Colour | Area | Lengths of Edges | Enlargements of red triangle 1 | |
|  |  |  | Linear scale factor | Area scale factor |
| 1 red |  |  |  |  |
| 2 blue |  |  |  |  |
| 3 lilac |  |  |  |  |
| 4 white |  |  |  |  |
| 3 green |  |  |  |  |
| 6 orange |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| SOLUTIONS | Colour | Area | Lengths of Edges | Enlargements of red triangle 1 | |
|  |  |  | Linear scale factor | Area scale factor |
| 1 red | ½ | 1, 1, √2 | 1 | 1 |
| 2 blue | 1 | √2, √2, 2 | √2 | 2 |
| 3 lilac | 2 | 2, 2, 2√2 | 2 | 4 |
| 4 white | 4 | 2√2, 2√2, 4 | 2√2 | 8 |
| 3 green | 4½ | 3, 3, 3√2 | 3 | 9 |
| 6 orange | 8 | 4, 4, 4√2 | 4 | 16 |

\*You could give learners the blank table above and ask them to fill in the information. Select some of the columns if you don’t want the class to do them all.

**ACTIVITY 2 QUADRILATERALS ON A 25 PIN GEOBOARD**

***DO*** Make a **quadrilateral** on your geoboard.

***TALK*** about and ***RECORD*** your quadrilaterals, as for the triangles in Activity 1.

You might like to make a 9-pin geoboard for these activities and photocopy 9-dot grids for the learners.

**References**

Fithian, E. (2005) Activity 3 Geoboards [www.home.ptd.net/~efithian/Geometry/Activity-03.html](http://www.home.ptd.net/~efithian/Geometry/Activity-03.html)

Furner M.J. & Marinas C.J.(2011) Geoboards to Geogebra: moving from the concrete to the abstract in geometry. Proceedings of the Twenty-third Annual International Conference on Technology in Collegiate Mathematics, ISBN 0-321-68984-4, Copyright (C) 2012 by Pearson Education, Inc. [www.archives.math.utk.edu/ICTCM/VOL23/S088/paper.pdf](http://www.archives.math.utk.edu/ICTCM/VOL23/S088/paper.pdf)

Scandrett, Hilary ( 2008) Using Geoboards in Primary Mathematics. Australian Primary Mathematics Classroom, v13 n2 p29-32 2008 [www.files.eric.ed.gov/fulltext/EJ802704.pdf](http://www.files.eric.ed.gov/fulltext/EJ802704.pdf)

**Take a ..Geoboard** <http://nrich.maths.org/10674>

**Free Web Ap** <https://itunes.apple.com/gb/app/geoboard-by-math-learning/id519896952?mt=8>

or <http://www.mathlearningcenter.org/web-apps/geoboard/>

**Making a Geoboard**

Video <http://www.youtube.com/watch?v=TEw61i1veOg>

<http://www.notimeforflashcards.com/2010/08/diy-geoboard.html>

<http://www.education.com/activity/article/geoboard/>

<http://www.feelslikehomeblog.com/2010/02/how-to-make-a-geoboard/>

<http://engagingtoddleractivities.wordpress.com/2010/05/07/homemade-geoboard/>

**Free Printable Geoboard Masters**

<http://nrich.maths.org/public/viewer.php?obj_id=6676&part=index>

(<http://eclectichomeschool.org/pdf/10x10dot.pdf>

<http://etc.usf.edu/clipart/galleries/math/geoboards.php>

<http://www.teachervision.fen.com/tv/printables/scottforesman/Math_3_TTT_7.pdf>

**Lessons with Geoboards**

Video <http://www.youtube.com/watch?v=ikaSgNDnrv0&feature=related>

Video <http://www.youtube.com/watch?v=OFucbbgLGZQ&playnext=1&list=PL351EA69AAEE764C3&index=18>

<http://nrich.maths.org/2883>

Tips for Manipulatives – Geoboards & list of sample activities [http://oame.on.ca/lms**tips**/files/Manips/**Geoboards**.pdf](http://oame.on.ca/lmstips/files/Manips/Geoboards.pdf)

<http://mathcentral.uregina.ca/RR/database/RR.09.98/loewen2.3.html> (angles, perimeter and area)

<http://mathforum.org/trscavo/geoboards/geobd6.html>

<http://www.cut-the-knot.org/Curriculum/Geometry/Geoboard.shtml>

Exploring Symmetry

<http://images.pcmac.org/Uploads/OnslowCounty/OnslowCounty/Departments/DocumentsCategories/Documents/Geoboard%20Challenge%20-%204th.pdf>

Exploring Area and Perimeter

<http://www.mathplayground.com/geoboard.html>

Worksheet <http://www.mathinscience.info/public/cover_up/geoboard_activities.pdf>

National Library of Virtual Manipulative Activities

(grades prek-2) <http://nlvm.usu.edu/en/nav/frames_asid_277_g_1_t_3.html?open=activities>

(grades 3-5) <http://nlvm.usu.edu/en/nav/frames_asid_172_g_2_t_3.html?open=activities>

(grades 6-8) <http://nlvm.usu.edu/en/nav/frames_asid_282_g_3_t_3.html?open=activities>

(making 3-d shapes) <http://nlvm.usu.edu/en/nav/frames_asid_129_g_1_t_3.html?open=activities>

(circular geoboard grades 3-5) <http://nlvm.usu.edu/en/nav/frames_asid_127_g_2_t_3.html?open=activities>

(circular geoboard grades 6-8) <http://nlvm.usu.edu/en/nav/frames_asid_284_g_3_t_3.html?open=activities>

(coordinate grid activities 3-5) <http://nlvm.usu.edu/en/nav/frames_asid_166_g_2_t_3.html?open=activities>

(coordinate grid activities 6-8) <http://nlvm.usu.edu/en/nav/frames_asid_303_g_3_t_3.html?open=activities>