APEC-Tsukuba International Conference V

Lesson Plan for Grade 9 (Grade3 at Junior High School)

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Title: Exploring Polygons on Electronic Geoboard

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Theme for Study: What is the role of technology in student mathematics learning at junior high school?

Objective of the Class: Through exploration of polygons constructed on electronic geoboard, students make observations and use their prior learning to represent their observations mathematically.

Explanation of Subject Matter in Relation to Theme, Objective, Curriculum and Students:

This lesson is taught to a group of students that the teacher is not familiar with. The choice of the lesson is to provide opportunities to discuss the role of technology in mathematics learning. As students do not have access to computers and there is only one computer in the class, the lesson is planned with that constraint in mind. In a more ideal situation, students would work in pairs on a computer. However, this constraint provides opportunity to study the role of technology in such situations, which is common in many Asia-Pacific countries.

Also as I am not the regular teacher, the lesson is not part of the regular curriculum. Instead it focuses on letting student use whatever mathematical ideas they have previously learnt.

Generally, students are asked to construct a polygon on a geoboard and to make observation about possible relationship between the area of the polygons and the number of dots.

The lesson requires the applet found on National library of Virtual Manipulatives

www.nlvm.usu.edu

There are alternate websites for this applet.

- http://mste.illinois.edu/users/pavel/java/geoboard/
- http://www.cut-the-knot.org/Curriculum/Geometry/Geoboard.shtml

Activities	Notes
<u>Introduction</u> Teacher shows a polygon on the screen and asks students to find its area.	
Teacher poses the problem <u>Problem 1</u> Draw a polygon where there is no dot inside the polygon. T: What do you notice? S mention variables such as area and number of dots. S mention other unrelated variables. T: What do you notice about the area and the number of dots? T: How is the area related to the number of dots?	Teacher distributes geo-board paper. Teacher allows students to use the electronic geoboard to resolve conflicts and difficulties in determination of area of polygons.
Teacher poses the problem <u>Problem 2</u> Draw a polygon where there is exactly 4 dots on the perimeter of the polygon. T: What do you notice? S: Area is related to number of dots. S: Area is related to the number of dots inside the polygon. S: The specific relationship is described. S: Use an equation to represent the relationship. S: Use a graph to represent the equation. Teacher uses the scaffold questions if students do not automatically focuses on the important variables. T: What do you notice about the area and the number of dots? T: How is the area related to the number of dots?	
Teacher invites students to set their own conditions and explore drawing different polygons and finding possible relationships between the area and the number of dots.	
<u>Conclusion</u> Teacher encourages students to explore the relationship between the area and number of dots in the polygon and on the perimeter of the polygon.	