

IMPROVING TEACHER QUALITY PROGRAM
Mathematics Within: Algebraic Processes and Its Connections to Geometry
Page 1 – Pre-planning: Teacher Lesson Plan
Kia Yang and LeQuyen Tran (4th grade)

Context of the lesson:

- 1. To help me understand the context of the lesson, please explain where this lesson occurs within a unit or series of lessons. Describe what led up to this lesson and what will follow.**

Exploration of area using Geoboards.
Area of squares and rectangles (counting square units)
Area of squares and rectangle using a formula
Fractions of area using Geoboards
Measurement of areas of polygons using pattern blocks
Tessellations
Area of squares and rectangles using different units of measurement
Area of triangles
Relationship between area and perimeter

- 2. What is the purpose of this lesson?**

The purpose of this lesson is to help students visualize how different units of measurement can be used to measure the same area, and how the unit used will change the answer but not the area.

- 3. What do you anticipate taking place?**

Students might be confused with the change of basic units used, but the practice, manipulatives, and their discussions with teammates will hopefully help those confused students to understand the concept of the whole verses the parts.

- 4. What strategies or techniques will you use to monitor learning?**

I will be walking around to observe and ask questions so students will have to explain their thinking verbally.

I will check how students fill in their charts.

I will also check their Learning Logs.

- 5. How will you know if students have achieved the objective(s)?**

Students will be able to explain why the answers are different for the same area.

Students will be able to come up with their own problems using pattern blocks or even create their own unit of measurement to use with their own problems.

IMPROVING TEACHER QUALITY PROGRAM
Mathematics Within: Algebraic Processes and Its Connections to Geometry

Participant Name: Kia Yang and LeQuyen Tran

Broad Topic: Area and Perimeter

Subtopic: Measuring the area of polygons

Grade: 4th

Time Frame: 30 minutes

Aim: Students will explore areas of polygons using different units of measurement.

Specific Objective(s):

- Students will use pattern blocks to explore areas of polygons.
- Students will be able to explain that the answers to the area of the same polygon will vary according to the units of measurement used.

Materials/Supplies:

- Pattern blocks
- Copies of polygons to explore and graph (pp. 4-5).
- Big chart of polygons for summarizing students' findings (pp. 8-11)
- Students' Learning Logs

References: (text/handouts, etc)

- *Everyday Math*, grade 4.

Lesson:

- **Introduction**
 1. Show overhead pattern blocks and name the different shapes (sun, mountain, cloud, and tree). (Transparency 1, p. 4)
 2. Explore the relationship between the blocks, using a chart to show how many mountains go into a sun, how many trees into a cloud, etc. (Transparency 2, p. 5)
 3. Write in the equalities using fractions when necessary.
 4. Use a Venn Diagram to show the different values of each shape compared to others, depending on the math problem. (Transparency 3, p. 6)
 5. Introduce the activity: Students will be using pattern blocks to investigate areas of 4 polygons.
- **Body**
 1. Students will be working in groups of 2 or 3 for this activity.
 2. Each group will get a set of pattern blocks, copies of 4 polygons to find areas, and a graph for filling in their answers.
 3. Each group will use one type of pattern blocks (only suns) to figure out the area of each polygon. Then they will use another (only mountains), until they use all 4 different pattern blocks. They will not mix pattern blocks for this activity.
 4. First, they will predict how many of each shape will fit the polygon and write their guesses on their chart (p. 7). They should try to explain their predictions to the group.
 5. Then, they will use the pattern blocks to fill in the shape of the polygon. Students will discuss how they think and explain their thinking to their teammates as they work together. They come up with answer to each problem.

6. Each student will fill in the chart for each polygon (p. 8-11). They should check how they write their fractions.
7. After they find all the answers, students will compare their guesses to the actual numbers. They will draw conclusion according to their findings.
8. Students will write in their Learning Logs how their predictions are compared to the actual count, how they figure out the answer, and if other members of their groups have different strategies. They can draw examples of how it was done. They can also write questions or comments on the activity and how this pertains to geometry.

- **Close**

1. Ask different groups to come up to show their answers and explain how they figured out their numbers.
2. Ask class to come up with conclusions about area and units of measurement. Does the answer change when you change your unit of measurement? Does the shape change with the different answers?
3. Fill in the class chart (p. 7) with the answers given by the students.
4. Write up a class conjecture about areas and units of measurement.
5. Ask students if they can transfer this experience to real life:
When and where can there be confusion with measuring?
Can the area of anything have more than one correct answer?
Where would there be a choice of different units when it comes to area? (tiling floors, quilt making, patio/deck building, etc.)

- **Application/assessment**

- As students work, I will walk around and ask questions. I will ask them to explain how they reason and also check how they work together.
- I will also check their Learning Logs to see if any review is needed.
- Students will be asked to use the pattern blocks to make up other problems. They can also create their own unit of measurement and make up problems for their peers to solve.
- Students will create their own shape related to real life. For example, they can choose to use the mountain unit to draw a house. They will guess how many units they will need to use to complete their picture, then draw it out, and count how many units they actually used.

Vocabulary

Unit

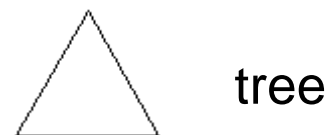
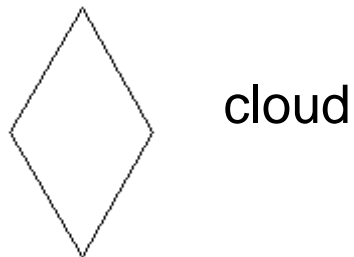
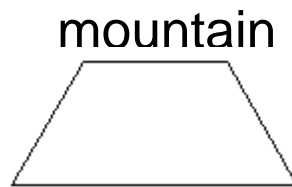
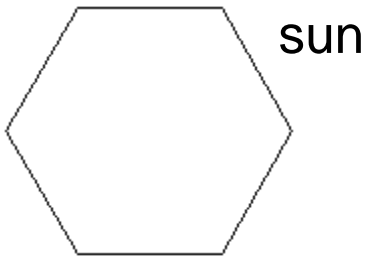
Polygon

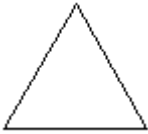
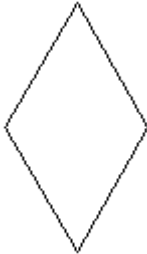

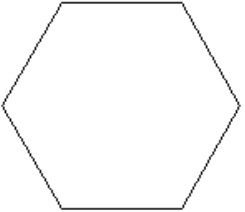

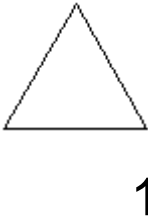
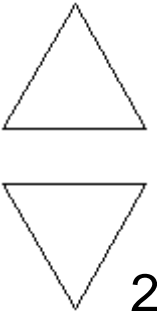
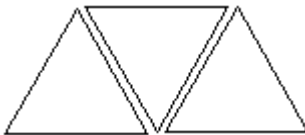
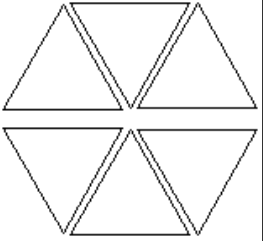
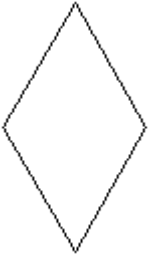
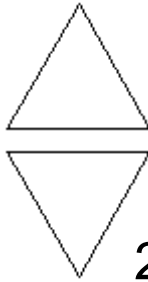
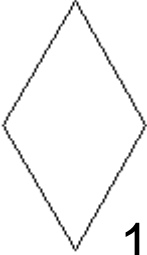

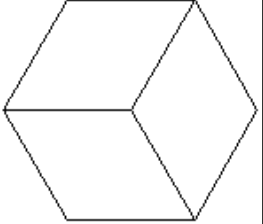

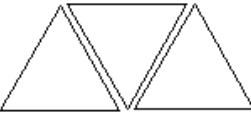
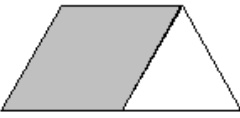

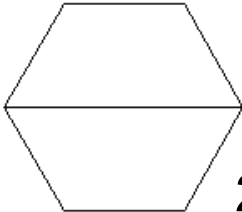
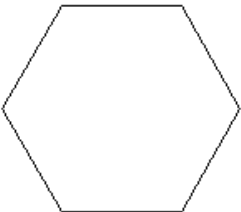
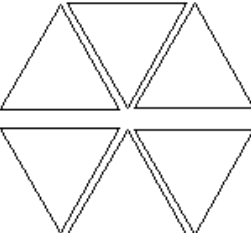
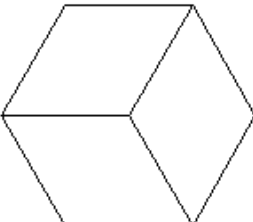
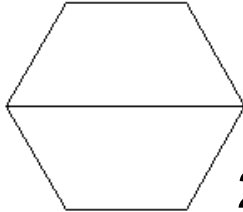
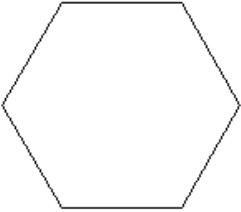
Area

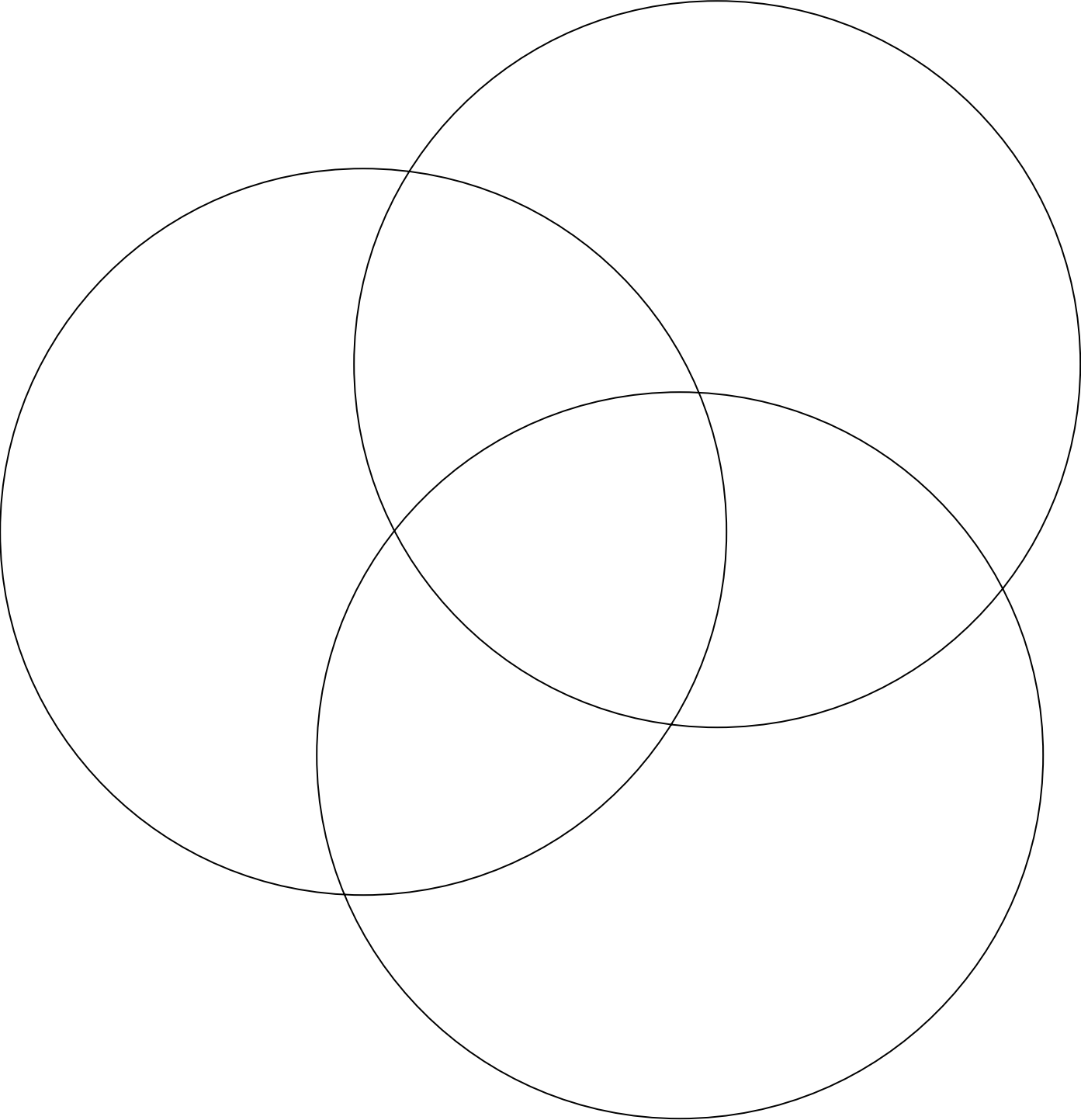
Measurement

Fraction

Label Polygons as Unit



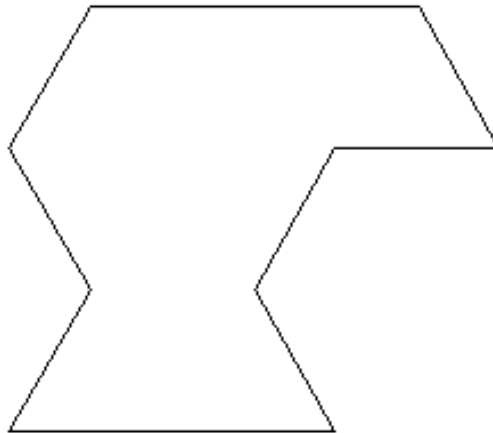
	 tree	 cloud	 mountain	 sun
 tree	 1	 2	 3	 6
 cloud	 2	 1	 $\frac{2}{3}$	 3
 mountain	 3	 $\frac{2}{3}$	 1	 2
 sun	 6	 3	 2	 1

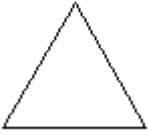
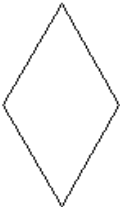

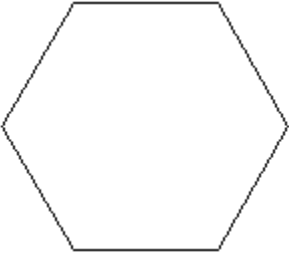


Page 7- Student's chart

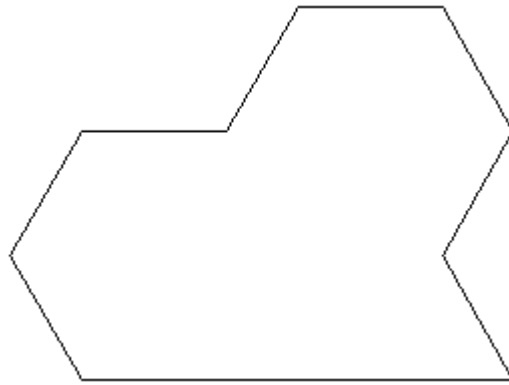
Unit	Prediction	Actual Number of Units


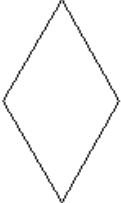

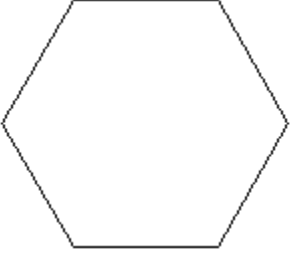
MEASUREMENT OF AREA



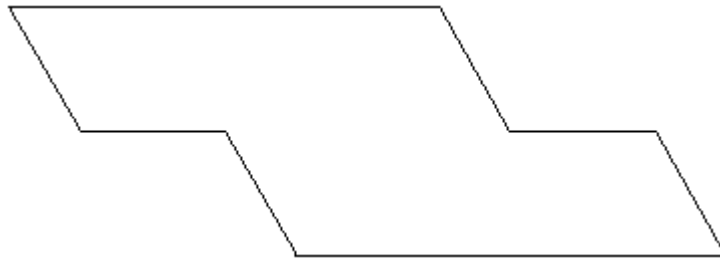
UNIT	PREDICTION	ACTUAL COUNT
 tree		
 cloud		
 mountain		
 sun		

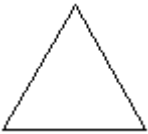
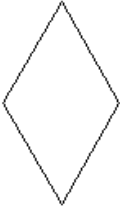

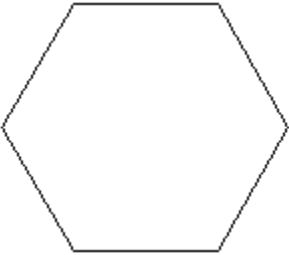
MEASUREMENT OF AREA



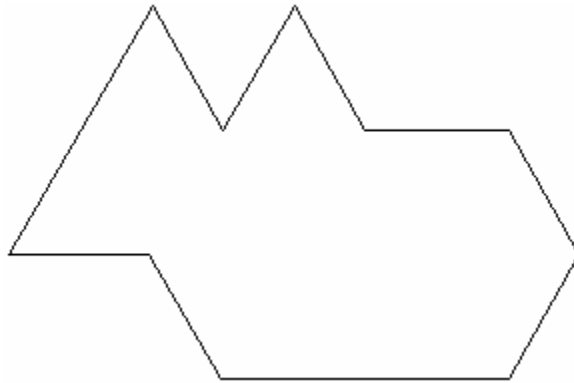
UNIT	PREDICTION	ACTUAL COUNT
 tree		
 cloud		
 mountain		
 sun		

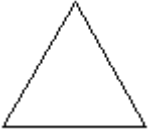
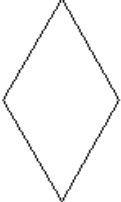

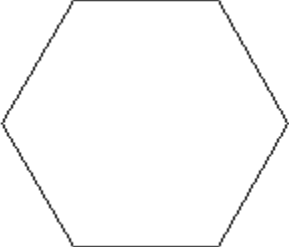
MEASUREMENT OF AREA



UNIT	PREDICTION	ACTUAL COUNT
 tree		
 cloud		
 mountain		
 sun		

MEASUREMENT OF AREA



UNIT	PREDICTION	ACTUAL COUNT
 tree		
 cloud		
 mountain		
 sun		