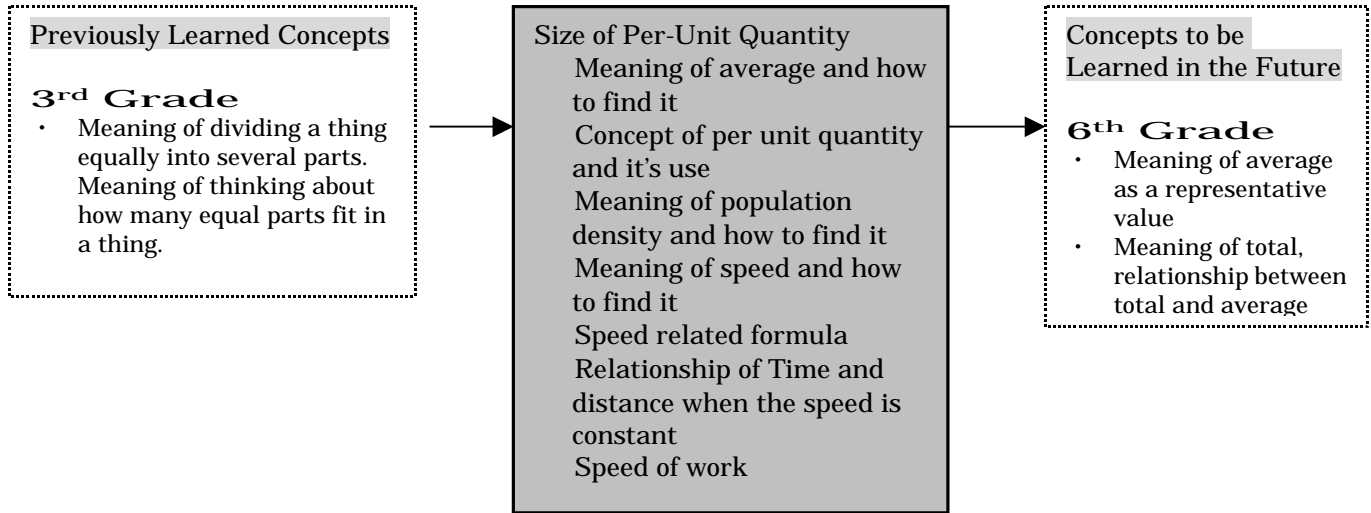


5th Grade, Class A Mathematics Lesson Plan

November 14, 2000 (Tuesday)
 2nd Period 5B Classroom
 Instructor: Tetsuya Nishida
 Number of Students: 14

1. Name of the Unit: Size of Per-Unit Quantity
2. Relationship of the Unit in the Curriculum



3. Instructional Plan

- Size of Per-Unit Quantity (Total: 18 lessons)
- Average 3 lessons
 - Size of Per-Unit Quantity 8 lessons (this lesson is 8/8)
 - Speed 6 lessons
 - Review 1 lesson

4. Instruction of this Lesson

- (1) Title: Size of Per-Unit Quantity – Is Japan blessed with greenery? --
- (2) Goal
 - Be able to find various size of per unit quantities using the values of the area of land, the area of forestry, and the population of Japan and the U.S.
 - Understand the meaning of size of per-unit quantity that the students found and excite the students' interest in comparing and investigating data.
- (3) Relationship of the Lesson to the Goal of Mathematics Education at the School

This lesson is a further exploration of the sub-unit, "size of per-unit quantity." In general, my students sense that "There is a lot of nature (greenery) in the U.S. but there is less in Japan," instinctively or based on their experiences. However, a statistic of the ratio of the area of forestry to the total area of countries' land shows that the ratio is much higher in Japan, 68% in Japan and 29% in the U.S. Therefore, in this lesson, the students will find various size of per-unit quantities using data about the area of land, the area of forestry, and the population of Japan and the U.S. Moreover, the students will examine this problem by comparing and investigating these data. Through this learning activity, the students will discover facts such as many people are living in a small land in Japan, and the area of forestry per person in Japan is much smaller than the case in the U.S. by using the data of

the population.

I would like to get closer to our school's mathematics goal by helping the students feel the importance of judging the circumstances mathematically and to enjoy the process.

(4) Learning Process

Steps	Activity of the Students	Teacher's Support and Points to Remember	Evaluation View Point
Intro- duction 5 min.	<p><u>1. Introduction to the Problem</u></p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> What reasons do you have, to think that Japan has less greenery than the U.S.? </div> <ul style="list-style-type: none"> • There are many trees around my house and my school. • There are many parks and fields with lawn. • There are many wild animals. That is evidence of much greenery. • Around my house in Japan, there are many buildings. <div style="border: 1px solid black; border-radius: 50%; padding: 10px; margin-top: 10px;"> Hummm... The ratio is bigger for Japan! It shouldn't be that way...! </div>	<ul style="list-style-type: none"> • Ask the students to tell to others whatever come into their mind • Introduce the ratio of the area of forestry and the land in Japan and the U.S. Japan: about 68% U.S.: about 29% • Show the figure representing the ratio 	

Development
40 min.

2. Confirming the Problem

Can we say that Japan is blessed with greenery? Let's think about it by finding out various per-unit quantities using data the area of land, the area of forestry, and the population of Japan and the U.S.

3. Individual Activity

	Area of Land	Area of Forestry	Population
Japan	370,000 km ²	250,000 km ²	120 million
U.S.A.	9,400,000 km ²	2,700,000 km ²	240 million

《Anticipated Student's Per-Unit Quantities》

Population density (Population per 1 km²)
Japan: about 320 people, U.S.A.: about 25 people

Area of land per person
Japan: about 3,100 m², U.S.A.: about 40,000 m²

Area of forestry per person
Japan: about 2,100 m², U.S.A.: about 12,000 m²

Population per area of forestry 1 km²
Japan: about 480 people, U.S.A.: about 89 people

Area of forestry per 1 km² of land
Japan: about 680,000 m², U.S.A.: about 290,000 m²

4. Presentation Activity

- * In Japan, many people are living in a small land.
- * The area of forestry per one person is much smaller in Japan compared to the case in the U.S.
- * I think a lot of people in Japan are living in the place that is not forestry that is why we think we don't have much greenery around us.
- * But the ratio of the area of forestry is bigger in Japan.

- Pass out the handouts
- Inform the students that they can use calculators. Also, tell them to show the results in round numbers by rounding off to the two highest digits.
- Ask the students to write down their expressions and ask them to clarify what kind of per-unit quantity they found.
- Ask the students to write down what they found by comparing the data for Japan and the U.S.
- Walk around the classroom and give suitable suggestions for the students who are having difficulties and try to grasp the students' thinking/solutions.
- Ask students to present what they found. Also check their calculation for the results.
- Ask students to present what they found. Also check their calculation for the results.
- Ask the students to present their thoughts for each per-unit quantity.
- Try to help students to understand the presented ideas by using pictures and figures.

Are the students able to find per-unit quantities?

Are the students able to compare, think out, and investigate using the data?

<p>Conclusion 5 min.</p>	<p><u>5. Confirming What They Learned</u></p> <p>* We can learn many interesting things when we look at numbers carefully. * We can see one thing in many ways.</p>	<p>• Admire the students' achievement for being able to find various per-unit quantities and being able to find many insights from the numbers.</p>	
------------------------------	---	---	--

(5) Evaluation

Were the students able to find many kinds of per-unit quantities using the 3 sets of data (area of land, area of forestry, and population)?

Were the students able to compare, think out, and investigate the situation in Japan and the U.S. using calculated numbers?

Data to Show to the Students

	Area of Land	Area of Forestry	Population
Japan	370,000 km ²	250,000 km ²	120,000,000 people
U.S.A.	9,400,000 km ²	2,700,000 km ²	240,000,000 people

Ratio of the area of forestry against the area of land



Anticipating Students' Per-Unit Quantities.

Population density (population per 1 km²)

	Expression	Answer
Japan	$120000000 \div 370000$	About 320 people
U.S.A.	$240000000 \div 9400000$	About 26 people

Area of land per person

	Expression	Answer
Japan	$370000 \div 120000000$	3100 m ²
U.S.A.	$9400000 \div 240000000$	39000 m ²

Area of forestry per person

	Expression	Answer
Japan	$250000 \div 120000000$	2100 m ²
U.S.A.	$2700000 \div 240000000$	11000 m ²

Population per 1 km² forestry

	Expression	Answer
Japan	$120000000 \div 250000$	480 people
U.S.A.	$240000000 \div 2700000$	89 people

Area of forestry per 1 km² land

	Expression	Answer
Japan	$250000 \div 370000$	680000 m ²
U.S.A.	$2700000 \div 9400000$	290000 m ²

Additional Preparation

Map of Japan and U.S.A. (Comparison of areas of lands)

A picture that shows comparison of the population per 1 km² in two countries.

A picture that shows comparison of the area of forestry per person in two countries.