

1. National Research Coordinator's Comments (English)

[00:00:00](#)

General Comments on Japanese Math Education

In Japanese junior high schools, mathematics is a mandatory subject and all the students are supposed to study the same content. This content is regulated by the *Guidelines for the Course of Study* issued by the Ministry of Education, Culture, Sports, Science and Technology. In the curriculum designed by the Ministry, there are no additional math courses where students might be grouped in accordance with their abilities, nor on their orientation towards their future academic majors, such as can be found in other countries.

Guidelines for the Course of Study is revised every 10 years. The Japanese lessons that we analyzed were videotaped from 1994 to 1995. However, current math lessons in Japan are based on the *New Guidelines for Course of Study*, which were issued in 2002. In the *New Guidelines for Course of Study*, the Ministry has inserted the phrase "enjoyment of mathematical activities" as their goal, and while they tried to achieve math learning in which students "find the task by themselves, learn by themselves, and solve the problems by themselves", they also reduced the instruction time from four hours per week to three hours per week and restricted the teaching content. At the time of videotaping, the contents which were taught in the eighth grade, but deleted in current curriculum include: "approximate value", "binary scale", and "flow chart". The content which is now taught in the higher grades includes: "similar figures", which was moved to the ninth grade; and "linear inequality with one unknown", "centroid of a triangle", and "organizing data" all moved to high school Math I. The content which was moved down from ninth grade to eighth grade includes a discussion of "probability".

Textbooks for junior high school math are published by six publishing companies, and all are examined by the Ministry of Education, Culture, Sports, Science and Technology. There are minor differences among the textbooks regarding how to present a given topic. However, the arrangement of chapters, et cetera, are all more or less similar. All schools plan their educational curriculum based on the Guidelines for the Course of Study and the textbooks. Therefore, it is possible to say that in Japan, more or less the same content is taught throughout the entire school system at any given time of the year.

Ninety-four percent of Japanese students attend public school. The other six percent attend a private or a National school.

The basic teaching style is whole-class instruction, but lately some schools have started incorporating "TT" (team teaching) by several teachers as well as group study. Starting in 2002, there's an increasing number of ability-grouped classes (class based on students' degree of mastery of the subject).

Many teachers value "*kikan-shido*" - i.e., strolling among students' desks while checking the students' rates of progress during deskwork - and while they personally assist individual students with the problems they are working on, such teachers often give a hint to the whole class in order to help the students' developing their thinking and increase their motivation. Moreover, many teachers stroll among students thinking about who should present the ideas, or in which order the ideas should be taken up, and this leads to a good whole-class interaction.

Thus, many teachers make the most of the students' opinions and individual thinking. However, we also observed many teacher-fronted classes. This tendency becomes stronger as grade levels become higher.

Also, according to the TIMSS 1999 data, in Japan, the ratio of math teachers who received their teaching certificates in mathematics or mathematics education is very high, and 93% of the students are instructed by such teachers (as compared with the international average, which is 73%, *TIMSS 1999 International Mathematics Report, Boston College*).

[00:00:15](#) **Homework**

Usually, as in this lesson, the teacher begins the lesson by going through the homework which was assigned in the previous lesson. However, in this lesson, the class spends about seven minutes altogether on going over their homework, which is a relatively long time for this type of activity.

In this lesson, the teacher explains by pointing out how students made various miscalculations. The teacher often gives mathematic expressions as homework in order to improve the students' ability for calculation.

[00:07:27](#) **Paper board**

The teachers sometimes utilize the paper board during "research lessons" or "public lessons," although it is much more common not to use it in the regular lessons.

[00:09:17](#) **Handout**

In this lesson, the teacher makes students write their ideas and answers in a small handout. In regular lessons, sometimes the teachers give handouts and sometimes have the students write the information in their notebooks.

[00:12:36](#) **"kikan-shido" assessing student progress during deskwork**

In Japanese lessons, teachers value students' ability to solve problems by themselves, and thus teachers often check students' problem-solving ways of thinking while strolling among the students' desks. Afterwards, these teachers may often ask several of the students to present publicly the results of their private work.

[00:13:43](#) **Explanation by the teacher**

In lessons requiring the use of many mathematical formulae and expressions, the teacher may often talk a lot in conducting the lessons. In this lesson, after this segment, this teacher repeats the same explanation several times on "what is known" (numbers of pastry, the price for the pastry), and "what is unknown" (how and how many they can buy). It seems that this teacher engages in this type of instruction more often than most other Japanese lessons, on average.

[00:34:34](#) **The numbers of the problems per lesson**

When dealing with problems requiring mathematical expressions, teachers often explain the example problem first, and then let their students look at a handout or at their textbook in order to do the exercise. In this lesson, the number of the problems that the students are being asked to work on is rather small, compared with a more typical lesson employing mathematical expressions.

[00:42:51](#) **Purpose of writing on the blackboard**

When students work on the board, they may or may not bring their notebooks. In this lesson, the goal of the instruction is for students to be able to do the problems on the board without referring to their notebook - i.e., they should be able to solve the problem without having to refer to their notes, if they have completely understood it.

[00:49:47](#) **Summary of the lesson, advantages of inequality**

In Japan, as in this lesson, teachers often summarize the target of a lesson at the end. The target of this lesson was to make the students understand the value or the advantage of some mathematical idea. To cultivate an "appreciation of the mathematical way of seeing or thinking" was one of the highly valued targets in the *Guidelines for the Course of Study* issued in 1993 as well as 2002.

In this lesson, the teachers do not use the textbook at all. However, in Japanese lessons in general, teachers often use the textbook throughout the entire lesson time, and/or use the textbook to present a summary of the lesson at the end of class.