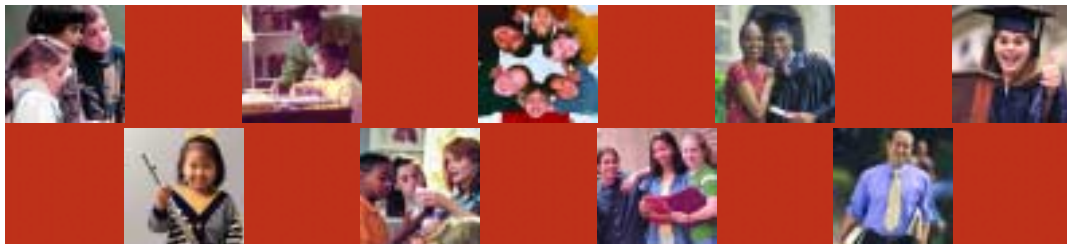# NCES

**National Center for Education Statistics**

# the condition of education 2003

## INDICATOR 26

# Instructional Activities for 8th-Grade Mathematics

The indicator and corresponding tables are taken directly from *The Condition of Education 2003*. Therefore, the page numbers may not be sequential.

Additional information about the survey data and supplementary notes can be found in the full report. For a copy of *The Condition of Education 2003*, visit the NCES web site (http://nces.ed.gov/pubsearch/pubsinfo.sap?pubid=2003067) or contact ED PUBs at 1-877-4ED-PUBS.

Suggested Citation:
U.S. Department of Education, National Center for Education Statistics, *The Condition of Education 2003,* NCES 2003-067, Washington, DC: U.S. Government Printing Office, 2003.

# Learning Opportunities
## Instructional Activities for 8th-Grade Mathematics

*In 8th-grade mathematics lessons in the United States, students spend 53 percent of the time reviewing previously studied content and 48 percent of the time studying new content.*

The 1999 Third International Mathematics and Science Study (TIMSS) included a Videotape Classroom Study of 8th-grade mathematics classes in Australia, the Czech Republic, Japan, the Netherlands, the Special Administrative Region (SAR) of Hong Kong, Switzerland, and the United States. The study used nationally representative class samples from these countries to examine the differences and similarities in mathematics lessons.

The study looked at the percentage of lesson time 8th-grade mathematics teachers devoted on average to reviewing previously studied content compared with studying (both introducing and practicing) new content. In the United States, no difference was found between the average percentage of lesson time devoted to studying new content and the percentage devoted to reviewing. By contrast, classes in Australia, Hong Kong, Japan, the Netherlands, and Switzerland spent more time, on average, studying new content than reviewing. The opposite was true in the Czech Republic, where more time was spent reviewing studied content than in all other countries except the United States (see supplemental table 26-1).

This study also examined how mathematics problems were solved in each lesson. The in-class explanation and discussion of each problem's solution was classified into one of four types, ranging from "making connections" (or explaining the mathematical relationships and/or reasoning involved in solving the problem) to "giving results only" (without an explanation of any mathematical processes) (see *supplemental note 5*).

On average, in the United States, 1 percent of problems per lesson were solved by making connections; 8 percent were solved with a discussion of mathematical concepts (but not mathematical relationships or reasoning); 55 percent involved an explanation of the steps and rules or the algorithmic procedures for solving the problem (but no explanation of the underlying mathematical concepts); and 36 percent were solved by giving results only. The Czech Republic, Hong Kong, Japan, and the Netherlands had a higher percentage of problems per lesson that were solved by making connections (10, 12, 37, and 22 percent, respectively). Compared with the United States, every other country[1] had a higher percentage of problems per lesson that were solved with a discussion of concepts (from 19 to 33 percent) (see supplemental table 26-2).

[1]Switzerland was not included in this particular analysis because English transcripts were not available for all lessons.

NOTE: Hong Kong is a Special Administrative Region (SAR) of the People's Republic of China and not a distinct country. However, this indicator refers to it as one of the study's "countries" for ease of reading and because this region was treated analytically the same as the countries in the study. Japanese mathematics data were collected in 1995. Detail may not sum to 100 percent because of rounding and the possibility of coding portions of lessons as "not able to make a judgment about the purpose."

SOURCE: U.S. Department of Education, NCES. (2003). *Teaching Mathematics in Seven Countries: Results from the TIMSS 1999 Video Study* (NCES 2003–013), figure 3.8. Data from U.S. Department of Education, NCES, Third International Mathematics and Science Study (TIMSS) Video Study, 1999.

FOR MORE INFORMATION:

Supplemental Note 5

Supplemental tables 26-1, 26-2

**MATHEMATICS LESSON ACTIVITY:** Average percentage of 8th-grade mathematics lessons spent studying new content and reviewing previously studied content, by country: 1999
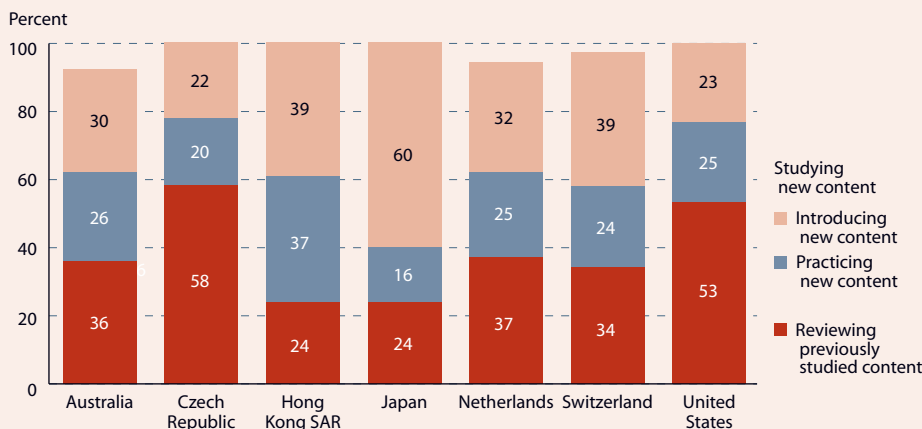
# Instructional Activities for 8th-Grade Mathematics

**Table 26-1.**    Average percentage of 8th-grade mathematics lesson time devoted to various purposes, by country: 1999

| Instructional activity | Australia | Czech Republic | Hong Kong SAR[1] | Japan[2] | Netherlands | Switzerland | United States |
|---|---|---|---|---|---|---|---|
| Lesson purpose[3] | | | | | | | |
| Reviewing previously studied content | 36.0 | 58.1 | 24.3 | 24.1 | 36.8 | 33.9 | 52.5 |
| Studying new content | | | | | | | |
| Introducing new content | 29.7 | 22.1 | 38.8 | 59.9 | 31.9 | 39.1 | 22.5 |
| Practicing new content | 26.3 | 19.8 | 36.9 | 16.0 | 24.6 | 23.9 | 25.0 |

[1]Hong Kong SAR is a Special Administrative Region (SAR) of the People's Republic of China.

[2]Japanese mathematics data were collected in 1995.

[3]For each country, average percentage was calculated as the sum of the percentage within each lesson, divided by the number of lessons. Detail may not sum to totals because of rounding and the possibility of coding portions of lessons as "not able to make a judgment about the purpose."

SOURCE: U.S. Department of Education, NCES. (2003). *Teaching Mathematics in Seven Countries: Results From the TIMSS 1999 Video Study* (NCES 2003–013), figure 3.8. Data from U.S. Department of Education, NCES, Third International Mathematics and Science Study (TIMSS), Video Study, 1999.

**Table 26-2.**    Average percentage of problems per 8th-grade mathematics lesson solved by explicitly using processes of each type, by country: 1999

| Lesson characteristic | Australia | Czech Republic | Hong Kong SAR[1] | Japan[2] | Netherlands | United States |
|---|---|---|---|---|---|---|
| Process used to solve mathematics problem | | | | | | |
| Making connections | 2.4 | 9.9 | 12.2 | 37.1 | 21.6 | 1.0 |
| Stating conceptions | 20.0 | 19.3 | 24.3 | 33.2 | 31.6 | 8.1 |
| Using procedures | 41.3 | 38.3 | 48.4 | 26.6 | 35.9 | 54.8 |
| Giving results only | 36.3 | 32.6 | 15.2 | 3.1 | 10.9 | 36.1 |

[1]Hong Kong SAR is a Special Administrative Region (SAR) of the People's Republic of China.

[2]Japanese mathematics data were collected in 1995.

NOTE: Analyses only include problems with a publicly presented solution. Analyses do not include answered-only problems (i.e., problems that were completed prior to the videotaped lesson and only their answers were shared). For each country, the average percentage was calculated as the sum of the percentage within each lesson, divided by the number of lessons. Switzerland was not included because English transcriptions of Swiss lessons were not available for mathematical processes analyses. See *supplemental note 5* for more information on the process categories. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, NCES. (2003). *Teaching Mathematics in Seven Countries: Results From the TIMSS 1999 Video Study* (NCES 2003–013), figure 5.9. Data from U.S. Department of Education, NCES, Third International Mathematics and Science Study (TIMSS), Video Study, 1999.

# Instructional Activities for 8th-Grade Mathematics

Table S26.   Standard errors for the average percentage of 8th-grade mathematics lessons spent studying new content and reviewing previously studied content, by country: 1999

| Instructional activity | Australia | Czech Republic | Hong Kong SAR | Japan | Netherlands | Switzerland | United States |
|---|---|---|---|---|---|---|---|
| Practicing new content | # | # | # | # | # | # | # |
| Introducing new content | # | # | # | # | # | # | # |
| Reviewing previously studied content | # | # | # | # | # | # | # |

#Rounds to zero.

SOURCE: U.S. Department of Education, NCES. (2003). *Teaching Mathematics in Seven Countries: Results From the TIMSS 1999 Video Study* (NCES 2003–013), appendix C. Data from U.S. Department of Education, NCES, Third International Mathematics and Science Study (TIMSS), Video Study, 1999.

# Instructional Activities for 8th-Grade Mathematics

Table S26-1.     Standard errors for the average percentage of 8th-grade mathematics lesson time devoted to various purposes, by country: 1999

| Instructional activity | Australia | Czech Republic | Hong Kong SAR | Japan | Netherlands | Switzerland | United States |
|---|---|---|---|---|---|---|---|
| Lesson purpose | | | | | | | |
| Reviewing previously studied content | 0.04 | 0.03 | 0.03 | 0.04 | 0.05 | 0.03 | 0.05 |
| Studying new content | | | | | | | |
| Introducing new content | 0.03 | 0.02 | 0.03 | 0.04 | 0.04 | 0.03 | 0.03 |
| Practicing new content | 0.03 | 0.02 | 0.03 | 0.03 | 0.04 | 0.02 | 0.04 |

SOURCE: U.S. Department of Education, NCES. (2003). *Teaching Mathematics in Seven Countries: Results From the TIMSS 1999 Video Study* (NCES 2003–013), appendix C. Data from U.S. Department of Education, NCES, Third International Mathematics and Science Study (TIMSS), Video Study, 1999.

Table S26-2.     Standard errors for the average percentage of problems per 8th-grade mathematics lesson solved by explicitly using processes of each type, by country: 1999

| Lesson characteristic | Australia | Czech Republic | Hong Kong SAR | Japan | Netherlands | United States |
|---|---|---|---|---|---|---|
| Process used to solve mathematics problem | | | | | | |
| Making connections | 0.01 | 0.01 | 0.02 | 0.03 | 0.05 | 0.01 |
| Stating conceptions | 0.20 | 0.19 | 0.24 | 0.33 | 0.32 | 0.08 |
| Using procedures | 0.41 | 0.38 | 0.48 | 0.27 | 0.36 | 0.55 |
| Giving results only | 0.36 | 0.33 | 0.15 | 0.03 | 0.11 | 0.36 |

SOURCE: U.S. Department of Education, NCES. (2003). *Teaching Mathematics in Seven Countries: Results From the TIMSS 1999 Video Study* (NCES 2003–013), appendix C. Data from U.S. Department of Education, NCES, Third International Mathematics and Science Study (TIMSS), Video Study, 1999.