Tutorial 1

T1 – 1. The article reprinted below describes a sample survey. Based on the information given in the article, describe:

(a) the *target* population;
(b) the *study* population and possible *frame(s)* for the selecting process(es) in this sample survey;
(c) the *respondent* population and the *sample*;
(d) a *response* and a *population attribute* of interest;
(e) four sources of *error* in the specific context of this sample survey.

The Globe and Mail, April 26, 1993, page A4

BY THE NUMBERS / *National test of 13- and 16-year-olds in mathematics will be held this week, with 65,000 participants helping rate provinces' programs.*

Canadian students figure to show their skills

BY JENNIFER LEWINGTON
Education Reporter
Toronto

WHEN 14-year-old Joe Coroa heard he would take part in today's first-ever national test of student skills in mathematics, his first thought was "Beat the Japanese."

His ambition – remarkable for one who admits he is weak at math – reflects the increasingly intense public interest in measuring and comparing educational results as Canadian schools come under fire for mediocre quality.

In fact, Japan has no part in the $3.4-million Canada-wide project, sponsored by the Council of Ministers of Education. Nevertheless, the Grade 9 student at Harbord Collegiate, along with about 65,000 other students across the country, is part of an unprecedented exercise that will give Canadians a new, if limited, way to compare educational results from one province to another.

This week the so-called School Achievement Indicators Program will measure how well 13- and 16-year-olds solve math problems, and next year it will assess how well they read and write. The project will also gather information on the participation and graduation rates of students.

In the math test conducted across the country this week, students will answer multiple-choice questions and answer other questions designed to demonstrate their ability to work out several stages of a math problem. Their performance will be judged in relation to five predetermined levels of knowledge and problem-solving in mathematics.

Thus, the results will show the public which province has the highest proportion of 13- and 16-year-olds able to solve the most sophisticated math problems, as well as determining the lowest level. In theory, the country-wide comparison may spur some provinces who do not perform well to change their curriculum and teaching methods.

However, since only a random sample of students in 1,400 schools will take part, Canadians will not be able to compare individual students or schools when the results are released this fall. In total, about 100,000 students will be involved in the two stages of the test. Last December, the provinces quietly divided the project in two for financial reasons.

North York director of education Veronica Lacey says the national project represents a step toward greater accountability for results by the education system.

"Parents want to know we have a frame of reference for accountability. Increasingly, the reference points they're asking for are national and international."

The council project has been dogged by controversy since it was conceived in 1989. Given the opposition of teacher organizations to a national test, the New Democratic government in Ontario, which traditionally counts teachers as ideological allies, pulled out of the project in 1991.

However, faced with growing public demands for improved educational results, the Ontario government returned to the table after negotiating terms of re-entry. The province was especially concerned that its students, representing a more heterogeneous mix than other provinces, would suffer if questions were not vetted for cultural and gender bias.

After Ontario returned to the project in late 1991, Saskatchewan bowed out after the election of an NDP government in 1992.

"That's the Canadian situation," George Molloy, project co-ordinator for the Council, said ruefully.

Despite the political and, more recently, financial headaches suffered by the project, it marks an unprecedented example of inter-provincial co-operation in education.

"There's never been any attempt to come to a concensus on what would be reasonable to assess across the country," said Michael Kozlow, the Ontario ministry of education's representative on the project.

Much of the impetus for that co-operation is provincial unease over the federal government's growing interest in education issues, especially national testing and standards.

Like some members of the public, some of the students who will take the test are skeptical about whether the project will lead to improved education quality in an era of budget cutbacks in all sectors, including education.

Patricia Point, a Grade 11 student at Harbord Collegiate, says "if Ontario isn't doing well you have to have a program to make the math marks go up. It's a waste of money if you're just going to say Ontario is behind."

She and several other Harbord students say they have no qualms about taking part in the test – even if it were to compare schools across the country.

But the students may have their own motives for being willing conscripts. They will miss their regular classes for the morning and, at Harbord, celebrate the test with a pizza lunch.

T1 – 2. A local fast food outlet is interested in assessing the reaction of its customers to a new formulation of its hamburger recipe. The management decides to conduct a survey of 200 customers by giving each surveyed customer a free hamburger and then administering a short questionnaire.

(a) Briefly describe three *different* selecting methods that could be used to obtain the 200 customers.
(b) For *each* of the selecting methods in (a), comment briefly on:
  (i) its *ease of implementation*;
  (ii) the likely severity of the limitation on Answers imposed by *non-response* error;
  (iii) the likely severity of the limitation on Answers imposed by *sample* error.

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