
Summary of Responses to the Mathematics 8 and 9 IRP

In February 2001, a response form and a copy of the draft Mathematics 8 and 9 IRP were distributed to all public, private, and band schools registering Grades 8 and 9 students; district superintendents; district resource centres; faculties of education; and parents (through BCCPAC). The draft contained the introduction, body, and Appendix F (illustrative examples). The questionnaire and draft were also available on the ministry web site.

This report summarizes all responses to the draft Mathematics 8 and 9 IRP. Specifically, responses were received from the following groups and individuals:

- District and school mathematics educators — those teachers and district staff who received the questionnaire through the schools or district offices. The demographics of the group are described in Appendix 1.
- The BC Association of Mathematics Teachers (BCAMT), also composed of school and district mathematics educators, provided a group response. The BCAMT response stated that it represented the viewpoints of the executive, although they made efforts to “present the views we think would be indicative of the majority of our members.” Responses from the BCAMT were considered by the writing team and incorporated into this report separately for the most part.
- The Mathematics Overview Team, composed of the BCTF, BCPVPA, BCSTA, BCCPAC, BCSSA, BCBC, BCALMER, and representatives from universities, colleges, and labour. Their response was in the form of a summary of the minutes of their meeting on February 9, 2001. Responses from the Mathematics Overview Team were considered by the writing team and incorporated into this report in the appropriate section.
- Staff from Special Programs provided a written report. Their comments focussed mainly on the information in the introduction and the suggested activities. Comments were addressed through discussions by the team and by the editor while revising the draft.

- The Aboriginal Education co-ordinator (Curriculum Branch) met with the team to discuss issues and make comments about the curriculum. Comments were recorded by the team and used while revising the draft.
- Dr. Werner Leidtke, mathematics education specialist in numeracy at the University of Victoria, met with the team to discuss the learning outcomes and suggested activities. Comments were recorded by the team and used while revising the draft.

The Introduction (Item 6)

Respondents were asked to rate the extent of their agreement with the following statement:

- The introduction captures the intent of the curriculum area and the principles of learning.

School and District Mathematics Educators' Response (in %)

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
7	50	42	1	0

Almost all school and district mathematics educators agreed or were neutral when asked if they thought the introduction captured the intent of the curriculum and the principles of learning. No patterns emerged in the written comments.

To support their positive ratings, school and district mathematics educators made comments ranging from “the chart is very useful” to how much they liked the emphasis on problem solving.

The staff of the Special Education Branch suggested revisions to the text in the sections on IEPs and adapting curriculum for ESL students. Those changes were made in the revision of the document. They also commented on the importance of direct instruction for students with diverse needs, the importance of assuring equitable access, and the complexity and abstractness of the grade 9 curriculum.

Curriculum Organizers (Item 7)

Respondents were asked to rate the extent of their agreement with the following statement:

- The curriculum organizers describe the appropriate major themes (or “big ideas”) that are important in this subject or course.

School and District Mathematics Educators' Response (in %)

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
8	85	8	0	0

There was total agreement among school and district mathematics educators and in the response from the BCAMT that the curriculum organizers describe the appropriate major themes (or “big ideas”) that are important in this subject or course.

No changes were made to the curriculum organizers.

Prescribed Learning Outcomes (Items 8 to 11)

Respondents were asked to rate the extent of their agreement with the following statements:

- The learning outcomes are consistent with and clearly support the curriculum organizer in which they are clustered.
- The learning outcomes are clearly written and understandable.
- The learning outcomes are consistent with the overview presented in the introduction.
- The learning outcomes are age/grade-appropriate in terms of the developmental needs of students.

School and District Mathematics Educators' Response (in %)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
8	7	92	1	0	0
9	13	81	2	4	0
10	4	92	3	0	1
11	2	43	50	5	0

When asked if the learning outcomes are consistent with and support the curriculum organizer (item 8), most school and district mathematics educators agreed, while 2 percent of school and district mathematics educators were neutral.

When asked if the learning outcomes are clearly written and understandable (item 9), most school and district mathematics educators agreed, while 6 percent

of school and district mathematics educators disagreed. Comments requesting clarification of learning outcomes included:

- What is “rate of volume” and “rate of area”?
- Provide illustration of Pythagorean relationships and examples of use. (p. 73)
- Give examples of prisms. (p. 75)
- Give examples of Venn diagram. (p. 90)
- Define scientific notation. (p. 64)
- Some PLOs are unclear—e.g., 26 and 32.

When asked if the learning outcomes are consistent with the overview presented in the introduction (item 10), most school and district mathematics educators agreed, with 3 percent giving a neutral rating.

When asked if the learning outcomes are age/grade-appropriate (item 11), 4 percent of school and district mathematics educators disagreed, while 56 percent were neutral. The following areas were questioned as to their age/grade-appropriateness:

- Pythagorean relationships.
- Surface area or volume calculations of composite 3-D objects are beyond many Grade 8s.
- Many students have difficulty with one- and two-step linear equations.
- Too many learning outcomes in Grade 9.

In response to item 11, the BCAMT made the following comment: “The learning outcomes may be age/grade-appropriate, but they are not necessarily ability appropriate, largely due to the continuous progress model of advancement in the Grades K-7....”

When asked if they had any suggestions for the overall improvement of the learning outcomes, school and district mathematics educators made the following suggestions:

- Give answers to the illustrative examples.
- Give limiting examples.

- Give examples of concrete, pictorial, and symbolic problems.
- Students on IEPs need basic math skills. They cannot do algebra or trig, because they can't even add or multiply.

As additional comments, respondents stated the following:

- More specificity is needed—comprehensive listing of outcomes, as in previous outlines. Inform teachers exactly what is to be taught in detail.
- The IRPs are comprehensive, and for many students the scope is too large. Given enough time, the PLOs may be completed, but not all students will be able to complete in a year of instruction.
- Include a large unit in solving equations and a unit on graphing linear equations, basic nonlinear.
- In Grades 8 and 9, put more emphasis on relationships and graphing. Could do some graphing calculator activities here. Will help for later years too.
- In Grade 8, give more exposure to algebra. Perhaps Grade 9 would not be such a jump for many.
- In Grade 8, remove Prob and Stats; and in Grade 9, remove Transformation and Prob and Stats.
- Math 8: weaker students will not be able to +, -, x, divide fractions symbolically/solve equations/Pythagorean equations/calculate area of composite figures/describe enlargements and reductions/draw scale diagrams.
- Math 9 has more than enough outcomes, and the Grade 8 program could move outcomes to make it a higher level as well as to distinguish it from being a rehash of Grade 7.
- The BCAMT is concerned that certain strands/organizers lack continuity, in that they are not addressed in each subsequent mathematics course from Grades 8 to 12. This is especially true of the Geometry (Shape and Space) and Trigonometry (Measurement) strands.

The writing team reviewed all comments, and changes were made as appropriate.

Numeracy Subset (Items 12 and 13)

Respondents were asked to rate the extent of their agreement with the following statements:

- The numeracy subset of learning outcomes is congruent with the definition of numeracy found in the IRP introduction.
- The numeracy subset of learning outcomes is consistent with and clearly supports the development of students' numeracy knowledge, skills, and attitudes at each grade.

School and District Mathematics Educators' Response (in %)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
12	4	74	15	4	1
13	4	80	5	11	1

There was considerable concern expressed by the Mathematics Overview Team about whether bolding the outcomes in the IRP to identify those most related to numeracy will result in school districts using only the numeracy outcomes and offering modified programs based solely on those outcomes. It is felt that this would be counter to the ministry's objective of preventing streaming of students too early and thus not allowing all students to meet their fullest potential. Furthermore, the loss of 9A as an alternative will cause problems for those students in the grey areas.

There were questions raised about whether this would reduce the streaming of students or actually create more differentiated streaming, with courses developed individually by school districts. School districts do not want to lose their professional autonomy to adapt courses for their students' needs but also want to have more direction from the ministry on how to accomplish this. It would be impossible to put students who cannot meet the Math 9 curriculum on IEPs because of the administrative burden on teachers. Schools/districts will adopt group IEPs to overcome this. The IEP process is felt to be administratively burdensome and not flexible.

The Mathematics Overview Team recommended not identifying numeracy outcomes but using performance expectations to assess the needs of students. The student's performance on an assessment level would determine the pathway for that student. The ministry needs to bring these issues to the school and school district level for further discussions.

The BCAMT response to item 13 was: “There are some PLOs that the BCAMT believes should be omitted or included in the numeracy subset.” The learning outcomes identified were reviewed by the writing team, and some changes were made.

When asked if the numeracy subset is congruent with the definition of numeracy, very few of the school and district mathematics educators disagreed or were neutral. Among the concerns was: “Sixteen- and 17-year-olds struggle with many of these topics in 10A and 11A. I am unsure that Grade 8 students with problems in mathematics would fare well.” Some respondents identified topics to add or delete. For example: “Solving single variable equations is not necessary or critical for all students to learn regardless of difficulty” and “Trigonometry is hard to follow—move to Grade 9.”

When asked if the numeracy subset of learning outcomes supports the development of students’ numeracy, few of the school and district mathematics educators disagreed, and most agreed. One who agreed noted the reduction in learning outcomes in Grade 9. Those disagreeing stated that the subset was too broad or expressed concern that the numeracy subset will become the curriculum for “grey area” students. Another stated that identifying the subset as appropriate for students on modified programs sets an unrealistic target for students and teachers.

Item 14 received the largest number of written comments from the school and district mathematics educators. Two respondents expressed frustration with the identification of the numeracy subset of learning outcomes:

- There doesn’t seem to be too much benefit for a student to be on the subset, since they have to cover most of the objectives anyway!!!
- It seems most of the outcomes are already included (apart from statistics).

School and district mathematics educators made many suggestions for inclusion and exclusion of learning outcomes. The lists were summarized and reviewed by the writing team, and some changes to the learning outcomes resulted from this review.

As additional comments, people suggested ways to make the subset more readily accessible, such as charts and so on, and made the following comments:

- Rethink the numeracy subset. It is unrealistic for weaker students to do so many of the learning outcomes listed there.

- The BCAMT strongly recommends that the numeracy learning outcomes be grouped together in one section to make them easier to find and reference.
- Remove IEP requirement (or modify requirement). Most schools have a no-fail Grade 8 policy. Combine that with no prerequisites for courses, and I don't see any teacher putting a student on the subset. Personally, I would inform the group that their course selection leads to Essentials and teach them the subset. They would still get passed on to the next grade level, even if they get a fail in the Math 8 course. This requirement is a make-work deal—making more work for already overworked teachers! Certainly a group plan would be sufficient.

In the final draft, the notion of a numeracy subset was abandoned in favour of the following position, which identifies the learning outcomes for all students and a set of suggested extensions for those teachers and students who wish to enrich and extend the curriculum:

- The prescribed learning outcomes for the Mathematics 8 and 9 curriculum are designed to prepare students for Applications of Mathematics 10 and Essentials of Mathematics 10. Students intending to take Principles of Mathematics 10 may wish to explore the suggested extensions identified at the bottom of column 1 in the body of this IRP. It is the responsibility of the teacher to determine which, if any, of the suggested extensions the class will include.
- The suggested extensions are not provincial curriculum but are provided to assist teachers in developing programs of study that go beyond the provincial curriculum. Using the suggested extensions can provide students with opportunities for enrichment, giving them the ability to explore additional topics and add greater breadth and depth to the topics under study.

Suggested Instructional Strategies (Item 16)

Item 16 asked respondents to offer specific suggestions to improve the overall quality of the suggested instructional strategies.

Several school and district mathematics educators responded by complimenting the range or quality of the activities suggested. A few respondents noted that some activities suggest the use of resources or equipment they do not have in their schools (e.g., hardware and software). One respondent requested that there be more activities suited to lower-ability students. Another respondent said that the activities are too time-consuming, while another said: “Give us worksheets.”

In the additional comments section of the questionnaire, people stated the following:

- Some of the instructional practices are very childish, which is great to some extent, but the reality is that in Grade 10 the content gets very challenging very quickly, and students need to be challenged and use more rigorous content. There is a lot to cover in Grade 10, therefore there needs to be a very strong theoretical base in Grade 9. It is a challenge to continue to make all mathematics fun and relevant.
- Omit the learning strategies and reduce the size of the IRP. It is too long and unlikely to be read. Leave these discussions to professional development and in-servicing.
- Many strategies suggest the use of computers and/or the Internet. Not all schools have ready access to these tools or resources.

Werner Leidtke made comments about the relevance of certain activities and suggested ways to improve them.

Most of the changes to the suggested instructional strategies were made to address their relevance and clarity.

Suggested Assessment Strategies (Item 17)

Item 17 asked respondents to offer suggestions to improve the overall quality of the suggested assessment strategies.

When asked to suggest ways to improve the overall quality of the assessment strategies, most school and district mathematics educators complimented the variety of activities. However, several considered them time-consuming and wanted activities that would be “less difficult to mark or assign a letter grade or percent.”

In the additional comments section of the questionnaire, people stated the following:

- The areas of evaluation and assessment and instructional strategies are sound for stronger students. There are few methods and examples [provided] that relate to “adapted” students.
- The strategies...represent a good, varied approach to assessment. However, the strategies of testing and quizzing should be mentioned and included as well. Otherwise the list should be called “alternative assessment strategies.”

- It would be useful to have an example or model final examination for Mathematics 8 and 9 to help teachers standardize the delivery of the curriculum. A separate examination for the numeracy subset would be useful as well.

Most of the changes made to the suggested assessment strategies were to address their relevance and clarity. A new section on test construction was added to Appendix C.

Illustrative Examples (Items 18 to 22)

Items 18 to 22 asked respondents to rate the extent of their agreement with the following statements:

- The illustrative examples are consistent with and clearly support the learning outcomes to which they relate.
- The illustrative examples are clearly written and understandable.
- The illustrative examples are consistent with the overview presented in the introduction.

Respondents were also asked to comment on the following:

- The illustrative examples are age/grade-appropriate in terms of the developmental needs of students.

School and District Mathematics Educators' Response (in %)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
18	12	68	15	3	1
19	19	74	3	4	0
20	28	67	1	4	0
21	3	75	17	5	0

Respondents were also asked to offer suggestions to improve the overall quality of the illustrative examples.

In response to item 18, the BCAMT expressed concern that the Grade 9 Appendix F on the Web did not perfectly match the print version. They also requested clarification of the purpose of the illustrative examples (i.e., “Are they intended to be a minimum standard?”) and asked if the ministry intends to include illustrative examples for the problem-solving learning outcomes. In

response to item 20, the BCAMT made the following comment: “Some areas are deficient in (or have no) examples, while others seem to have an overabundance of examples.”

Most school and district mathematics educators agreed that the illustrative examples are:

- consistent with and clearly support the learning outcomes
- clearly written and understandable
- consistent with the overview presented in the introduction
- consistent with and clearly support the learning outcomes
- age/grade-appropriate

The written response by school and district mathematics educators to items 18 to 22 included the following points of view:

- Several comments were highly positive and supportive of the work.
- Some said particular graphics were unclear.
- Several asked for a return to “limiting examples.”
- Three commented that even with the examples, some students will have difficulty.
- Several comments suggest that people see the illustrative examples as THE activities for students, not as examples to clarify the learning outcomes.

In the final draft, the illustrative examples were reorganized to be parallel with the new structure of prescribed learning outcomes and suggested extensions.

Other Comments

Comments from other sections of the response form were put under the relevant topics in this report. The following comments did not fit under any of the given categories.

SMALL SCHOOLS

Several respondents pointed out the plight of the smaller school. For example: “Small schools are problematic in that three pathways cannot be implemented,

due to staffing shortages. There will be no Applications of Mathematics unless the ministry addresses this issue.”

ADDITIONAL RESOURCES

Comments included:

- I would like to see developed a BIG resource on problem solving—a step-by-step method, practice problems, etc.
- An alternate course should be written for weaker students at both Grade 8 and 9 levels (as with Math 9A). Homogeneous groups are much more effective for all students. Research bears this out in math.
- Make a table of contents in the IRP PDF files so that each section is easy to locate. The paper versions are too big.
- Develop an outline that goes through many textbooks in use to identify and match sections of the textbook to the learning outcomes.
- It would be nice to have a document that includes strategies and techniques for adapted and modified students. The preamble includes information about these students but the [rest of] the IRP does not refer to these students.
- Mathematics teachers are told to adapt and modify. It would be nice to have a separate listing of IRPs and instructional strategies and assessments to use.
- A separate IRP to address lower/slower kind of math students would be most useful.

CHANGES TO THE CURRICULUM

Comments included:

- [Provide a] highlight sheet of changes—easier to find them. The document is quite intimidating to look through. Don’t have time. If it had been easier, more teachers would have taken an interest.
- How much time do you think teachers have to devote to continuous demands for feedback on curriculum, which seems to be in a constant state of flux?
- Are the needs of students really so different now than three, five, or eight years ago?

CALCULATORS

Comments were made frequently about the need for students to practise mental arithmetic. For example: “We believe there should be less emphasis on calculator use (students are forgetting their times table, to estimate, can’t add, subtract quickly....) Calculator use should be earned. Grades 8 and 9 do not need graphing calculators.”

Appendix 1: Demographics of the School and District Mathematics Educators

The response deadline for the school and district mathematics educators was April 4, 2001, although several responses received on April 12 were also included in the tallies.

A total of 179 school and district mathematics educators responded to the questionnaire. Of those responding, 48 responded individually, while 131 responded in groups. Group sizes ranged from three to 52.

Specific demographic information was not requested from those who responded as a group.

Of those who responded individually:

- Thirty were male and 17 were female. Of these, 33 percent reported that they were 50 years of age or older.
- Then percent of respondents reported that they taught Mathematics 8 and/or 9.
- Nine respondents identified themselves as mathematics specialists, and nine identified themselves as specialists in another subject.
- Most teachers had bachelor's degrees, while 16 of the 48 had master's degrees. Seven individuals checked "other."
- Of those responding to the question, 42 percent had 10 years experience or less teaching, while 58 percent had 11 years experience or more. Fifty-three percent of the teachers reported having 10 years experience or less teaching mathematics, while 47 percent reported having 11 years experience or more.