

Publisher Questions to Western and Northern Canadian Protocol (WNCP) Mathematics Team

- 1. How will the answers to questions being asked at this meeting be incorporated into the curriculum and communicated to both the reviewers of the submitted programs and, ultimately, to teachers?**

WNCP Response: At this point, the WNCP CCF for K–7 Mathematics document is a draft and only minor changes to K–7 will be made to clarify outcomes and achievement indicators. Once this is signed off by the ADMs as the K–9 CCF, changes will not be made. Questions and responses will be posted on the WNCP web site for all to view so there should not be any surprises.

- 2. How does each publisher know that the curriculum has been interpreted correctly?
Could more than one indicator be provided for every outcome? Currently, some have only one indicator and the scope of the outcome can be broadly interpreted.**

WNCP Response: The outcomes are the legal piece and what should be used to guide resource development. The indicators provide guidance but are not an exhaustive list of indicators of student understanding. There are only nine outcomes in K–7 with a single indicator, although at least two of them have bullets. If only one indicator was included, it was felt that was sufficient to address the scope of the outcome. However, the WNCP reserves discretions and privileges on the manner in which it interprets the curriculum.

- 3. Can cross-strand connections be used to support a particular outcome?**

WNCP Response: These are encouraged as long as the outcomes are from the same grade level. In fact, to support the learning of concepts, and the philosophy of the WNCP, it is a must!

- 4. Can ideas from strands not yet included formally in the curriculum, e.g., graphs at the primary level, be used to support development in strands that are being addressed?**

WNCP Response: These could be used as strategies to develop concepts. However, publishers need to be cognizant that graphing is not an outcome at this grade level and if included in the lesson or activity it is not to be assessed. The ideas not formally in the curriculum should only be used as a tool for learning and should not become the focus of the lesson and should not be assessed.

- 5. What is considered too much overlap from year-to-year? Please be specific.**

WNCP Response: The teacher's resource can include strategies for addressing and assessing prior knowledge. Specifically:

- Re-teaching and assessing outcomes from previous grades is considered extraneous and should not appear in a student resource.
- Similarly, teaching and assessing of outcomes from upcoming grades is extraneous content and should not appear in a student resource.
- Activities that connect ongoing learning to previous learning within a grade level are encouraged.

- 6. Technology is not mentioned in the curriculum prior to Grade 4. Does this mean that computer applications cannot be used to explore any number situations at all, even problem solving situations? How does this affect the overall process of technology as one of the eight processes?**

WNCP Response: As long as students can meet the outcomes without the use of technology, technology can be used as a teaching tool. It is also important that strategies for teaching the same content without the use of technology are also included.

- 7. How are students to record their three-dimensional work when they are not required to do two-dimensional representations of 3-D objects anywhere in the curriculum? This includes recognizing 3-D shapes, when drawn on a page, and drawing them as well.**

WNCP Response: Making a 2-D representation of 3-D objects is not appropriate at a young age. The first time students are asked to do this is in Grade 5 where it is developmentally appropriate. The work on recognizing 3-D shapes in earlier grades should be done with actual objects.

- 8. Where do students begin to learn how to calculate the value of a total purchase or how to make change? The first mention of addition and subtraction of decimals is in Grade 6.**

WNCP Response: Work with whole numbers can include finding totals in cents. Work on decimal notation of money can begin in Grade 6. Making change and finding the value of the total purchases do not have separate outcomes in the CCF but should be incorporated into the appropriate Number outcomes.

Kindergarten:

- 9. Does “familiar three-dimensional objects” mean everyday geometric shapes or objects, e.g., objects that have the shapes of spheres and prisms, or does it mean anything three-dimensional, e.g., people, food and computers?**

WNCP Response: Familiar 3-D objects go beyond basic geometric shapes. Anything 3-D can be used or referred to as long as the student bases the sorting on a single attribute and can explain the sorting rule used.

- 10. When “sorting by an attribute,” are all attributes appropriate, or are only geometric or measurement ones acceptable? For examples, are attributes like “colour” and “sparkling” to be used, or are geometric attributes, like round or straight sides, the only ones to be used?**

WNCP Response: Further to the previous answer, a variety of attributes are acceptable and variety is key. We want the student to base the sorting on a single attribute and to explain the sorting rule used; e.g., sort buttons by the number of holes.

- 11. There is no reference to positional vocabulary, e.g., above or below, in the curriculum. Where will this be taught? Can it be used incidentally in Kindergarten?**

WNCP Response: These vocabulary words are common across disciplines and are not included in the mathematics curriculum.

- 12. The curriculum states that students are to write numerals from 1 to 100 in Grade 1, but there are no outcomes about recording numerals in Kindergarten. Are students supposed to only start recording numerals in Grade 1?**

WNCP Response: Yes. Kindergarten teachers should focus on developing number sense through activities, both oral and hands-on, and not focus on having students write numerals.

- 13. Can coins be used to represent numbers; e.g., a nickel has the same value as 5 pennies? Can coins be used as a tool; e.g., only use pennies to represent numbers to 10?**

WNCP Response: It is okay to use pennies as counters but do not introduce a nickel as being worth five pennies. Students can count to 10 using pennies or loonies, or any coins, but if they count two nickels they should talk about this as being two, not as having a value of 10 cents.

- 14. Can things like a calendar be used to represent numbers? Is everyday use of the calendar and hundreds chart appropriate in the Kindergarten classroom, even though the numbers are beyond those discussed in the curriculum, or must this be saved for introduction in Grade 1?**

WNCP Response: Teachers need to use things that are relevant to children and that help them develop their understanding of numbers to 10. The calendar is better suited to Grade 1.

Grade 1:

15. Can common mathematics terminology regarding 3-D objects in Kindergarten, and 2-D shapes in Grade 1, be introduced before Grade 2 if it is not assessed?

WNCP Response: Please refer to extraneous content guidelines in the draft Call for Resources.

16. Can calculators be used in an exploratory way with young students, e.g., exploring patterns, if no paper and pencil are used or mental outcomes are compromised?

WNCP Response: As stated in the response to Question 6, as long as students can meet the outcomes without the use of technology, technology can be used as a teaching tool. It is also important that strategies for teaching the same content without the use of technology are also included.

17. Can coins other than pennies be used to represent numbers; e.g., using nickels to count by fives?

WNCP Response: It is appropriate to use pennies as counters but do not introduce a nickel as being worth five pennies. They can count to 10 using pennies or loonies, or any coins, but if they count two nickels they should talk about this as being two, not as having a value of 10 cents.

18. Students are asked to read and write numbers to 100, but only numbers to 20 are actually investigated. What, exactly, is intended; simply rote reading and writing, or some attention to place value?

WNCP Response: Grade 1 looks at numbers to 20 in-depth while it looks at numerals to 100. The latter is more rote than the former. If a strong foundation is provided in Grade 1, working with numbers past 20 and place value can be developed in subsequent grades.

19. What is meant by the outcome “Investigate and predict the results of constructing and deconstructing 2-D shapes and 3-D objects, and verify predictions,” especially as it applies to *predict* and the use of names and shapes?

WNCP Response: See the revised outcome, “Replicate composite 2-D shapes and 3-D objects.” The new indicators are:

- Select appropriate 2-D shapes from a given set of 2-D shapes to construct a given composite 2-D shape.
- Select appropriate 3-D objects from a given set of 3-D objects to construct a given composite 3-D object.
- Predict and select the 3-D objects used to produce a composite 3-D object and verify by deconstructing the composite object.

20. Can common mathematics terminology regarding 3-D objects and 2-D shapes be introduced in Grade 1, while leaving the naming and recording until Grade 2?

WNCP Response: Students are not expected to know these terms but may come to class knowing the names of the shapes. Naming shapes should not be expected, assessed or used exclusively. This vocabulary is not formally introduced until Grade 2.

21. Are tangrams commonly found in Grade 1 classrooms?

WNCP Response: As is the case with any manipulative, access to tangrams would vary from school to school. There is an expectation that classrooms would have manipulatives; however, no specific manipulative is mandated in the curriculum.

Grade 4:

22. When an outcome specifies that a variable is used, does it mean a letter variable, or are other symbols, e.g., a box, acceptable?

WNCP Response: In Grade 4, it is expected students will use a symbol for the unknown. In Grade 5, letter variables will be introduced.

23. Where do students count a mixed collection of coins? If this is to be done in Grade 4, to what value do the students count?

WNCP Response: This can start in Grade 2 with the ideas of skip counting and representing numbers in a variety of ways, and can build from there. Money should be incorporated when it matches the learning outcome.

24. Money is not mentioned in the curriculum. Can money contexts, including recognition of coins of various values, be used to solve problems and develop ideas about numeracy?

WNCP Response: See answer to Question 23.

25. On page 99 of the curriculum indicators, there is a discussion regarding different intervals and many-to-one correspondences. Many-to-one correspondence suggests intervals, or scales, on the frequency axis. Do intervals mean the same thing, or does this suggest groupings along the x-axis? If not, when will this be introduced?

WNCP Response: Many-to-one does not suggest intervals on the frequency axis but refers to groupings along the x-axis in a bar graph and the legend in a pictograph.

26. In Grade 3, estimating sums and differences only specifies two-digit numbers, but calculating sums and differences specifies up to three-digit numbers. There

seems to be a contradiction. Please clarify, as this affects background information for Grade 4.

WNCP Response: Children need to become good estimators. To do this they need a good sense of number. Using large numbers is difficult. Limiting estimating to the sums and differences of two digit numbers allows children to develop good strategies for estimating addition without worrying about large numbers. The goal of this outcome is to develop estimation skills.

27. Should students be able to name the strategies or principles, e.g., front-end estimation or distributive principle, or just use them?

WNCP Response: Students should be able to explain the strategy they are using. The name of the strategy can be included in the Teacher's Resource but the terminology should not be what is assessed. The understanding and application of the strategy is what is to be assessed.

28. Are students ever to combine units, e.g., 3 m and 2 cm, as a lead up to expressing measure with decimals?

WNCP Response: In Grade 3, students should be able to describe the relationship between centimeters and meters. To do more than that is to force them to look at conversion between units in only one direction, e.g., meters to centimeters; since centimeters to meter may be a decimal and they have not studied decimals to hundredths yet. Leave combining measurements with different units until it fits into a numbers and operations outcome, e.g., Grade 5 and beyond, or where it is an automatic fit with the outcome and the achievement indicators. The students need to have the appropriate number and operations background before doing conversions.

29. Where are students introduced to the idea of kilometers? This particular unit is not mentioned with other linear measurement in either Grade 3 or Grade 5.

WNCP Response: It is not appropriate for students to actually measure in kilometers in the elementary grades. The term kilometer is first mentioned in an achievement indicator in Grade 8. Kilometers are addressed in the science curriculum.

30. What is meant by “Describe, name, and construct 3-D objects, including rectangular prisms, triangular prisms”? Does *including* mean exclusively prisms? The question is posed because all outcomes focus on prisms; except that there is one indicator related to nets of all types of 3-D objects, including cones, cylinders and pyramids.

WNCP Response: The indicator says “such as” not “including”; and “such as” means they are examples and do not have to be addressed.

- 31. Students need to focus on some of the attributes of cones, cylinders and pyramids before they explore nets, but there is no mention of exploring their attributes. Is this just assumed?**

WNCP Response: This was an anomaly and will be changed for the final document. This Outcome 5 in Shape and Space (3-D objects and 2-D shapes) will be moved out of Grade 4.

Grade 7:

- 32. Should the GCF and LCM be introduced in Grade 6, when working with factors and multiples, or in Grade 7 to prepare for fractions? Could it be in both grades? Does this then imply overlap?**

WNCP Response: GCF and LCM have not been included as specific outcomes in the CCF. There is often too much of a focus on LCM when doing work with fractions. GCF or LCM could come up incidentally in Grade 7 but students should not be forced to memorize rules for either GCF or LCM at either Grade 6 or 7.

- 33. In the curriculum, where are students taught rate?**

WNCP Response: This concept is not in K–7 and since grades 8 and 9 have not been finalized we cannot identify if or where it will appear. It should not appear in your Grade 7 resource. You will be able to see the Publisher Draft for grades 8 and 9 in December 2005.

- 34. Where are percents less than one and greater than 100 introduced? Is it in Grade 8?**

WNCP Response: This concept is not in K–7 and since grade 8 and 9 have not been finalized we cannot identify if or where it will appear. It should not appear in your Grade 7 resource. You will be able to see the Publishers Draft for grade 8 and 9 in December 2005.

- 35. Number strand, specific Outcome 4, third achievement indicator states: “sort a given set of fractions as repeating or terminating decimals.” Does this mean identify whether a fraction will have a terminating or repeating equivalent, or does it mean simply looking at a written decimal and observing whether it repeats.**

WNCP Response: This means identify whether a fraction will have a terminating or repeating equivalent.

- 36. Which transformations, if any, apply to “Describe positional change of points using horizontal and vertical descriptors in relation to a reference point in a four quadrant Cartesian plane?”**

WNCP Response: The transformations could be translation, reflection or rotation as long as the image of the transformation(s) has integral coordinates.

37. Is there more work with transformations in Grade 8 than suggested in Grade 7? What are we leading students to in Grade 8 through the use of positional changes?

WNCP Response: The outcomes for grades 8 and 9 are not yet completed. The development of an understanding of transformation within a Cartesian plane is a crucial foundation in the development of understanding transformations when relating functions, or relations, to their graphs.

38. What does the indicator “Describe and explain examples of geometric constructions in the environment” actually mean?

WNCP Response: The indicator has been changed to ‘describe and explain examples of parallel line segments, perpendicular line segments, perpendicular bisectors and angle bisectors in the environment.’ As well, “to solve problems” has been removed from the outcome.

39. How does the indicator “Solve problems that require the use of geometric constructions” help interpret “Perform geometric constructions to solve problems?”

- What types of problems are to be solved?
- Toward what content is this outcome leading students in Grade 8?

WNCP Response: “To solve problems” has been removed from the outcome as well as the achievement indicator.

40. At what grade levels are students to investigate congruence and similarity? No mention is made of these topics, but there is some assumption about congruence in some of the constructions.

WNCP Response: Grade 6, Shape and Space, Outcome 6 is an intuitive/concrete development of the idea of overlaying of angles and sides to determine congruence. Grade 5, Shape and Space, Outcome 8 is again an intuitive/concrete development of the idea of congruence. The concept of similarity is mathematically more difficult than congruence. Both congruence and similarity will be covered more mathematically in Grade 8 or Grade 9.

41. What types of equations will students be asked to solve in Grade 8?

WNCP Response: Since grade 8 and 9 have not been finalized we cannot identify what types of equations will be included at this time.

42. Is solving equations by graphing meant to be in Grade 8 or Grade 9?

WNCP Response: This concept is not in K–7 and since grades 8 and 9 have not been finalized we cannot identify if or where it will appear at this point in time.

- 43. What technologies and software packages or programs can we assume are available to junior high students? Grade 5, Shape and Space, Outcome 8, and Grade 6, Shape and Space, Outcome 7, talk about performing transformations “with and without technology.” Can we assume this technology is also available for use in Grade 7, Shape and Space? What level of access can we assume students will have to this technology?**

WNCP Response: Although access to technology will vary from school to school, there is an expectation that classrooms would have access to technology. However, no specific technology will be mandated in the curriculum. Technology can be used to enhance learning but there should also be some strategies that do not necessarily require it. The student and teacher resources for which we are currently looking should not be about how to use a specific technology, but should provide good problem-solving situations and tasks that can be solved with the use of technology. It is up to the jurisdictions, teachers and students to choose they type of technology they want to use. We do not want a resource that specifies one particular type of technology over another.