

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

- 1. The kilometer is not mentioned in the K-7 curriculum. In previous publisher exchanges with the WNCP math team, we heard that the kilometer would be in the Grade 8 mathematics program, but that it is covered in the Science curriculum at earlier grades. Does this mean that we can use the kilometer in contextual problems to support the development of larger number concepts in grade 4 (rather than measurement concepts), without it being deemed extraneous content?**

WNCP Response: It was decided to exclude km because the students cannot easily measure or have a workable reference for km. There are more relevant and practical ways to use cm and m as well as large numbers without focusing on km.

- 2. Rounding is not referred to in the curriculum at any grade level. Can rounding be taught explicitly, at the Grade 4 level or other levels as developmentally appropriate, as a useful tool when estimating, and to support the mathematical process of mental math and estimation?**

WNCP Response: We prefer the idea of “what ten, what hundred, what thousand” is a number “close to” be used in estimating rather than the term “rounding.” We do not want rounding to be taught explicitly unless other estimating strategies are taught at the same time.

- 3. Grade 4, Outcome N8 refers to comparing and ordering fractions using concrete materials, a number line, and benchmarks of 0, $\frac{1}{2}$, and 1. The AI’s refer to ordering fractions with the same numerator. Are we restricted to considering only fractions with the same numerator, or may students at Grade 4 also be asked to compare, say, $\frac{1}{2}$ and $\frac{3}{4}$? (Grade 5 refers to comparing and ordering fractions with and without like denominators.)**

WNCP Response: Students are to compare fractions with the same numerator. The point is for students to realize that the bigger the denominator, the smaller the part is that is being represented. Students should also compare and order fractions with the same denominator.

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1. **Grade 4 Shape and Space outcome 1 is “Read and write time from digital and analog clocks, including 24-hour clocks.” Is there a requirement that a particular type of 24-hour analog clock be used? For example, the two below are different.**



WNCP Response: There is no requirement as to the type of analog clock used.

2. **Grade 4 Shape and Space outcome 3 refers to “irregular 2-D shapes.” Is this referring to polygonal shapes or does it include shapes with curved sides for the purpose of estimating?**

WNCP Response: For the purpose of this outcome, “irregular shapes” referred to polygonal shapes.

3. **At what grade level do students measure duration of time? The Grade 4 Shape and Space (Measurement) outcome 1 specifies reading and writing time, but not measuring duration, or how long an event takes from beginning to end. The concern is that calculating duration is something other than straightforward subtraction of multi-digit numbers.**

WNCP Response: Students in Grade 4 should be able to calculate the duration of time using manipulatives (clocks). It is not expected that students will do this symbolically. The types of activities they address should be common activities for Grade 4 students and should not occur across time zones.

4. **Grade 7 Patterns and Relations, Outcome 6: We know the coefficients must be integers. Are there limitations on the solutions with which you want students to deal? For example, can a solution be a negative integer? A rational number?**

WNCP Response: The expectation is that solutions be positive integers.

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General

- 1. The measurement of temperature is not required by the K–7 math curriculum. We assume it will be addressed by the science curriculum. Does this mean that a thermometer cannot be used for number work?**

WNCP Response: The use of a thermometer is not excluded, but it should not be the only concrete material referenced in any particular section, especially before Grade 6 when integers are introduced. Negative numbers should not be used prior to Grade 6.

Grade 1

- 2. Numerical patterns are specified in Grade 2; these are not specified in Grade 1. Does this mean that numerical patterns would be considered extraneous in Grade 1?**

WNCP Response: The intention was to keep the work in Grade 1 in non-written form (kinaesthetic and concrete instead). This outcome is about building understanding of patterns; numerical patterns do not need to be included. For Grade 1, patterns should be more concrete/kinaesthetic/observable in the real world.

- 3. Patterns and Relations, SO2 – Students can transfer the pattern clap, tap, clap, tap to the pattern circle, square, circle, square (for example). Do we want children to describe these as “the same pattern” because both of them can be represented by abab?**

WNCP Response: They are different representations of the same type of pattern. The abab is yet another type of representation of that pattern type, so it would not be a necessary case, but it is a possible case that students might use to describe what is happening in the pattern.

- 4. On a related note, while the SO wording does not indicate that children are to use letter representations of patterns, selected AIs do: since the AIs are not policy, may we interpret that the use of letter representation, by the children, is not required?**

WNCP Response: One possible way of describing a pattern would be with the letters, but it should not (and, therefore, need not) be done exclusively. The use of letters is a viable way of communicating the pattern.

- 5. In Grade 1, there are no measurement outcomes that indicate the use of non-standard units, just the use of comparison. Because this represents a significant departure from the last curriculum, it’s important to clarify for our authors:**

would it be deemed extraneous content if a resource were to have children use objects, such as linking cubes or straws or paper clips, in combination with counting to describe how long an object is?

WNCP Response: Grade 1 is direct comparison of objects to identify if one is longer, shorter or the same length as the other. Students should be able to compare 3 objects, using direct comparison, and order them from smallest to largest or largest to smallest. Grade 2 is when students start to measure objects using non-standard units.

Grade 4

- 6. Shape and Space (Measurement), SO3 – Students are to “determine and record the areas of regular and irregular 2-D shapes.” We need clarification of the word “determine,” in particular because all AIs suggest “firm” or calculated answers through such verbs as “determine,” whereas the third bullet in SO3 uses the word “estimate.” In “determining” the area of an irregular figure that does not cover a whole number of square units, are students expected to come up with an estimate that includes parts of a unit?**

WNCP Response: We expect students to use grids of known units and superimpose the grid to determine the area. If the shape does not lend itself to whole numbers of units, then the student would have to estimate by saying the area is approximately ? square units and to justify their answer.

- 7. For the same outcome, could we clarify the term “irregular 2-D shape”? We know that non-square rectangles, trapezoids, and scalene triangles are irregular 2-D shapes, as are other rectilinear figures such as the floor drawing for an L-shaped room. Their areas can be determined relatively simply with the use of a grid. Would it be considered extraneous to include irregular figures that might tie to students’ classroom activities or contextual stories – for example, considering the area of a child’s footprint, or comparing the areas of prints left by two different animals in the wild? For these figures, students can only estimate area, since the curved outlines will not “map” onto the units represented in a grid overlay.**

WNCP Response: It would be appropriate to include irregular figures that might tie to students’ classroom activities or contextual stories if the student was asked to estimate and not calculate the area, possibly by using a grid overlay or referent.

- 8. Shape and Space (Measurement), SO3 – Students are to construct different rectangles for a given area (m^2), to demonstrate that many rectangles are possible. This will be physically difficult to do in a classroom or even in a hallway, given the size of materials required. Should we limit students’ hands-on constructions to square centimetres?**

WNCP Response: It is not necessary to limit students' hands-on constructions to square centimetres, but they need to be given reasonable parameters for the construction of m^2 areas. An entire class could push their desks aside and explore $12 m^2$ quite easily, or when it is nice outside they could do it in the playground and take digital photos to talk about when they are back in the classroom.

- 9. Shape and Space (3-D Objects and 2-D Shapes), SO4 – Students are to describe, name, and construct 3-D objects, including rectangular prisms and triangular prisms. All AIs refer to prisms. Are other standard 3-D objects, such as cones, cylinders, and pyramids, required here, or would their inclusion constitute extraneous content?**

WNCP Response: We intended it to only be about rectangular and triangular prisms.

- 10. Statistics and Probability (Data Analysis) – The general outcome is “Collect, display, and analyze data to solve problems.” Nowhere in the specific outcomes or AIs does it mention that students are to collect data. In Grade 3, SO1, students collect first-hand data. Is it implicit that in subsequent grades, students continue to collect data, or would this be considered extraneous material?**

WNCP Response: The general outcome is the overarching theme for the total of all the grades, not for each specific grade individually. What is done in the individual grades builds toward, but does not completely cover the entire scope of the general outcome. It would not be an issue if there was a problem that had students, as a set-up to their designated tasks, collect first-hand data, but this should not be the focus of the learning at this grade.

Grade 7

- 11. N1 requires students to explain why a number cannot be divided by zero, but multiplication and division of integers is not covered at this grade. This outcome might be more easily addressed when looking at multiplication and division of integers.**

WNCP Response: This is about contributing to the students continuing development of number sense and division. A student would be able to explain that division by zero does not make sense. If we consider division to be an action (like a verb), then it is easy to demonstrate why division by zero can not be done. If you have 12 cookies and some friends arrive at your house, you can share the cookies among your friends. If some friends come to visit and you have no (zero) cookies, you can not share the cookies with your friends. If you have a jar full of cookies but no friends come over, you still cannot share the cookies with your zero friends.

- 12. Number, SO5 and SO6 – In SO6, students demonstrate an understanding of addition and subtraction of integers concretely, pictorially, and symbolically. Should students add and subtract positive fractions and mixed numbers pictorially?**

WNCP Response: That should be part of their learning experience.

- 13. Patterns and Relations (Patterns), SO2 – Please clarify how students are to graph algebraic expressions. Are students to evaluate an algebraic expression in order to plot points?**

WNCP Response: Yes, but since it is limited to discrete points, the points should not be joined with a line.

- 14. Shape and Space (Measurement), SO1 – Students describe the relationship among radius, diameter, and circumference of a circle, and relate circumference to pi. In SO2, students develop and apply a formula for the area of a circle. When will students develop and apply the formula for the circumference of a circle – is it implicit in SO1 since students are immersed in the related concepts already at this level?**

WNCP Response: One indicator is about knowing that pi is C/d , and another is about solving for C , d , or r , therefore, the students are already working with an understanding of the formula. The direct mention of it was avoided so the formula would not become the over-riding focus of the learning.