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

Grade 5

1(a). Number, SO 6, AI 2 calls for the interpretation of remainders, including "express remainders as fractions, e.g., five apples shared by two people." This suggests the use of mixed numbers at Grade 5. The curriculum however contains no explicit mention of mixed numbers until grade 6, when relating improper fractions to mixed numbers is required. (G6, N4 – AI 1)

WNCP Response: The division would first be done (5 divided by 2) and then the remainder would be expressed as a fraction. The solution would read something like, "The two people would get two apples each and **1/2** of the remaining apple." This does not require the use of mixed numbers – it is a recognition of how the remainder from the division could be interpreted and expressed. The answer "2 apples and one half more" is preferred to the answer "2 ½ apples". This is scaffolding toward mixed numbers.

1(b). Could we verify that the concepts of improper fractions and mixed numbers (5 apples divided by 2 people can be written as 5/2, which is equivalent to 2 1/2) are appropriate for Grade 5? No Or, are we to ignore the AI cited? No

WNCP Response: This outcome was not meant to examine mixed fractions. Students could orally state that each person would receive 2 apples and a half of another one. Students may state that the apple was cut in half or in 2 equal parts for sharing.

2(a). Shape and Space (3-D objects and 2-D shapes) SO 5 requires students to identify perpendicular, intersecting, parallel, vertical, and horizontal edges and faces. The concept of angle – to develop right angle – is needed for a non-juvenile discussion of perpendicular line segments; however, the study of angles is a grade 6 topic. May publishers provide enough understanding of angles, and right angles in particular, to support the development of perpendicularity?

WNCP Response: The discussion of right angles can only be included at the concrete level. This means you can show students how a wall meets the floor in such a way as one stands straight up on the other and explain that we call this a right angle. When this occurs, we say the wall is perpendicular to the floor. You may also want to say that when two lines are perpendicular, they form a square corner where they meet. We often use the symbol of a square corner (the angle with a box/square) to indicate a right angle. You can refer to the symbol for perpendicular, an upside down T, and explain how the lines sit one straight up from the other, and form a square corner or a right angle. The focus should be on the

concept of perpendicular, not on the concept of a right angle. The understanding of this concept should be developed using concrete examples, rather than intersecting lines on a page.

2(b). Also related to this outcome: since vertical and horizontal orientations result from gravity, they are not really meaningful when applied to a 2-D shape unless that shape is the face of a 3-D object. That is, AI 2 and 7 are problematic, unless we are meant to interpret vertical as "from top to bottom of a rectangle, and parallel to the sides" and horizontal as "from one side to the opposite side of, for example, a rectangle."

WNCP Response. Horizontal and vertical can be defined in relation to the observer's position. When you look at a chart, you see horizontal and vertical lines. Those lines will reverse roles if we rotate the chart but that is very clear to students when they consider how their physical relationship to the chart has been changed.

3. Could we clarify which definition of a trapezoid we should use; we have found both inclusive and non-inclusive definitions in a wide range of authoritative mathematics dictionaries. So, if there is a preference, should we define trapezoid as a quadrilateral with at least one pair of parallel sides, or a quadrilateral with exactly one pair of parallel sides?

WNCP Response: There is no consensus in the mathematics world on the definition of trapezoid. For use in the student text, the WNCP mathematics team has decided to adopt the definition of a trapezoid as having exactly one pair of parallel sides. We ask, however, that the teacher guide contains information explaining that there are two acceptable definitions of trapezoid. It would be desirable for the teacher guide to explain to teachers how the definition that has a trapezoid having at least one pair of parallel sides would change the hierarchy of naming quadrilaterals. Having students discuss this may be a suggested extension in the teacher guide.

4. "Is it acceptable, for SO2, to have students work with estimating sums and differences of 4-digit and 5-digit numbers?"

WNCP Response: Yes, it is acceptable. Students, however, may use some smaller numbers to develop their skills in using these estimation strategies as this is the first time they are listed in the curriculum framework.