MATH UP Grade 4 Summer Learning

For students who have just completed Grade 4

Because of the increasing focus on fractions, multiplication, and division in Grade 5, there are several topics involving this content, including areas of rectangles, that I decided should be part of the focus of Grade 4 to ready students for Grade 5. As well, the topic Representing Whole Numbers allows for some review of place value.

The topic of pattern allows for attention to number but from a softer perspective.

Therefore, the Grade 4 topics I decided to focus on to ready students for Grade 5 are the following:

- Representing whole numbers
- Representing fractions
- Comparing fractions
- Multiplication and division facts
- Multiplication and division
- Increasing patterns
- Area of rectangles

Essential Understandings that are the focus of the support:

WN–1 Every whole number can be represented in many ways. Each way highlights something different about that whole number.

WN–2 A place-value system standardizes how whole numbers are decomposed and how that decomposition is recorded. A place-value system makes it easier to describe and compare numbers.

F–1 Every fraction can be represented in many ways. Each way highlights something different about that fraction.

F–3 When a fraction is used to describe a part of a whole, the whole must be known to make sense of the fraction.

F–5 There are different ways to compare and estimate fractions, such as relating the numerator and denominator, using benchmark numbers, and thinking of each fraction as multiple units of a given size.

PR–1 Sometimes it is useful to compare two numbers in terms of how far apart they are, but other times it is useful to compare them in terms of how many units of one number it would take to fit into the other.

O–3 Multiplication is about a change from a unit of a given size to a unit of 1. You know the size and the number of units (the size and the number of groups) and you multiply to figure out the number of units of 1 (the product).

O–4 Division is about a change from a unit of 1 to a unit of a given size. You know the number of units of 1 and the size of the unit (the dividend and the size of the group) and you divide to figure out the number of units (the number of groups). Or you know the number of units of 1 and the number of units (the dividend and the number of groups) and you divide to figure out the size of the unit (the size of the group).

O–5 There are relationships among the four operations. Addition and subtraction are inverse operations. Multiplication and division are inverse operations. Any multiplication situation can be thought of as repeated addition and vice versa. Any division situation can be thought of as repeated subtraction and vice versa.

O–6 A place-value system standardizes how numbers are decomposed (i.e., in tenths, ones, tens, hundreds, and so on) and how that decomposition is recorded. Decomposing by place value makes it easier to perform operations with numbers.

O–7 Performing operations with numbers is often made easier by decomposing and recomposing numbers and/or by thinking of numbers in other units.

O–9 Estimating is an essential part of any computation to catch errors or to give a feel for how to proceed with a calculation.

O–10 There are always multiple strategies for determining the result of a computation, whether it is an estimated or an exact result.

PA–1   Every pattern involves some kind of repetition.

PA–3   There is no way to be certain how a pattern continues without a pattern rule.

A–1   Many of the properties that underlie operations are useful in certain circumstances to simplify calculations.

M–6   Some measurements of an item are independent of other measurements of that item, but some are related.

M–7   Sometimes known measurements can be used to calculate unknown measurements.

M–8   Measurement formulas allow us to use measurements that are simpler to determine in order to calculate measurements that are more difficult to determine.

This has been set up for 20 sessions of about 1.5 to 2 hours each:

- Each day includes at least one Number Talk.

- Each day also includes either a Diagnostic Task, which may be followed up with an additional Number Talk or some practice activities, or a MathUP lesson, which is followed up with practice activities.

Number Talks that are particularly recommended are the following:

Grade 4: 4, 8, 25, 28, 55, 61, 62, 66, 71
Grade 5: 7, 12, 15, 27, 45, 75

Grade 5 Diagnostic Tasks to check on prerequisites from Grade 4 come from these topics:
- Representing Whole Numbers
- Multiplying Whole Numbers
- Dividing Whole Numbers
- Representing, Comparing, and Ordering Fractions
- Patterns
- Area Relationships

On a day that a Diagnostic Task is used (based on the seven focus topics), there is a Number Talk followed by the Diagnostic Task. The task should be described as an activity, not a test, to reduce any anxiety students might feel.

It might be appropriate to review some of the vocabulary in the Diagnostic Task before administering it.

If students struggle with the Diagnostic Task, it might be a good idea to go back to the related Grade 4 Diagnostic Tasks and treat them as additional activities. These tasks come from the following topics:
- Representing Whole Numbers
- Representing Fractions
- Comparing and Ordering Fractions
- Simple Multiplication and Division
- More Complex Multiplication and Division
- Patterns
- Area

If there are no problems with the Diagnostic Task and you have more time to work with students, you might choose to work on additional Number Talks, or you might choose to use one or more of these Minds On activities from the following topics:
- Representing Whole Numbers
- Estimating and Comparing Whole Numbers
- Representing Decimal Numbers
- Estimating and Comparing Decimal Numbers
- Adding and Subtracting Decimal Numbers
- Simple Multiplication and Division
- More Complex Multiplication and Division
- Patterns

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The suggested MathUP lessons that follow assume that students are working at the Grade 4 level and that it is not necessary to return to lessons from an earlier grade.

Before beginning a lesson, it would be valuable for the teacher to read the Sum It UP section to review the content being covered and then move on to the three parts of the lesson — Minds On, Action, and Consolidate — followed by the Your Turn Questions and additional suggested practice activities.

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Strand	Topic	Lesson	* Prerequisite Topics
N	Representing Whole Numbers	**Lesson 2** Representing Four-Digit Numbers Using Thousands, Hundreds, Tens, and Ones	None
N	Representing Fractions	**Lesson 1** Fractions of an Area **Lesson 2** Fractions of a Set **Lesson 3** Fractions on the Number Line **Lesson 5** Equivalent Fractions	None
N	Comparing and Ordering Fractions *	**Lesson 1** Fair Shares **Lesson 2** Relating Numerators and Denominators to Estimate	Representing Fractions
N	Simple Multiplication and Division	**Lesson 2** Relating Multiplication Facts **Lesson 4** Relating Division Facts	None
N	More Complex Multiplication and Division *	**Lesson 1** Estimating Products and Quotients **Lesson 2** Multiplying Two-Digit Numbers **Lesson 3** Dividing Two-Digit Numbers	Simple Multiplication and Division Using Place Value to Multiply and Divide
A	Patterns	**Lesson 2** Exploring Growing Patterns	None
SS	Area	**Lesson 2** Relating Area to Lengths and Widths of Rectangles	None