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SUSTAINABLE  
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WG/GAML/4 mathematics

# GLOBAL PROFICIENCY FRAMEWORK FOR MATHEMATICS Grades 1 to 9



United Nations  
Educational, Scientific and  
Cultural Organization



UNESCO  
INSTITUTE  
FOR  
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LEARNING



# GLOBAL PROFICIENCY FRAMEWORK FOR MATHEMATICS

Grades 1 to 9

OCTOBER 2020



BILL & MELINDA  
GATES *foundation*



## ACKNOWLEDGMENTS

This document, the Global Proficiency Framework (GPF or framework) for Mathematics, grades one to nine, was developed by the UNESCO Institute of Statistics (UIS); the US Agency for International Development (USAID); the World Bank; the Foreign, Commonwealth and Development Office (FCDO)—formerly the UK Department for International Development (DFID); the Australian Council for Educational Research (ACER); the Bill and Melinda Gates Foundation; and representatives of many other development partner organizations, including several university professors. A complete list of participants who lent their considerable expertise to this initiative can be found in the contributors’ section of this document.

The GPF for Mathematics defines important mathematics-related knowledge and skills learners should develop in primary and lower secondary school. It also describes the minimum proficiency levels learners are expected to demonstrate, with respect to the defined knowledge and skills, at each grade level, from grades one to nine.

This important resource would not have been developed without the immense contributions of all participants and stakeholders. Without their time and dedication, this framework would not exist.

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## ACRONYMS

ACER	Australian Council for Educational Research
DFAT	Australian Department of Foreign Affairs and Trade
DFID	UK Department for International Development
IBE	International Bureau of Education (UNESCO)
GAML	Global Alliance for Monitoring Learning
GCFRM	Global Content Framework of Reference for Mathematics
GPD	Global Proficiency Descriptor
GPE	Global Partnership for Education
GPF	Global Proficiency Framework
GPL	Global Minimum Proficiency Levels
IBE	International Bureau of Education
PLM	Policy Linking Method to set global benchmarks
PLT	Policy Linking Toolkit to set global benchmarks
SDG	Sustainable Development Goal
UIS	UNESCO Institute for Statistics
UNESCO	United Nation's Education, Scientific, and Cultural Organization
USAID	US Agency for International Development

## OVERVIEW OF THE DEVELOPMENT PROCESS

The Global Proficiency Framework for Mathematics (also referred to as the GPF or the framework) defines the *global minimum proficiency levels* that learners are expected to demonstrate at the end of each grade level, from grades one to nine. The GPF was developed by mathematics educators, curriculum experts, and psychometricians with extensive experience developing and implementing mathematics programs in a wide range of countries and contexts. Their names and affiliations are listed in the contributors' section of this document.

The development process was an extensive one. It began in October 2018 with the development by the UNESCO International Bureau for Education (IBE) of the Global Content Framework of Reference for Mathematics (GCFRM). The GCFRM synthesizes content and assessment framework information from more than 50 countries from around the globe, providing a picture of the common expectations countries have for learners' performance in mathematics.

In April and June 2019, mathematics educators, curriculum specialists, and psychometricians from around the world met in Washington, DC, to outline, based on the GCFRR and other national and regional curriculum and assessment frameworks developed for mathematics, a research-based progression of the minimum knowledge and skills learners in grade two (or primary two) to grade six (or primary six) should be able to demonstrate with respect to the key domains of mathematics. The draft framework outlined, for each skill or knowledge item retained, the performance of learners of in four proficiency levels as shown in **Figure I** below: *Below Partially Meets Global Minimum Proficiency, Partially Meets Global Minimum Proficiency, Meets Global Minimum Proficiency, and Exceeds Global Minimum Proficiency.*

**Figure I. Global Proficiency Levels (GPLs)**



The draft framework was field tested in at least nine countries, including Bangladesh, Djibouti, the Gambia, Ghana, India, Madagascar, Malawi, Nigeria, and Senegal during the 2019-2020 academic year. The lessons learned from those field tests informed the organization, beginning in May of 2020, of a second round of consultations with mathematics educators, curriculum experts, and psychometricians from the global community, many of whom had participated in the first round. During on-line deliberations between May and August 2020, experts revised the initial GPF and added grades one (primary one) and seven, eight and nine. The result is a GPF that covers the entire nine years of basic education.

The GPF is the product of extended discussions and rich, lively debates over an eighteen-month period. This ongoing exchange of expertise has resulted in a comprehensive, evidence-based evaluation framework for mathematics that represents the consensus of the global community about what learners should know and be able to do when it comes to mathematics.

The GPF is also the product of extensive collaboration between donor agencies and assessment organizations committed to developing and implementing common methods for measuring and reporting on progress on Sustainable Development Goal 4 (SDGs), including the UNESCO Institute for Statistics (UIS), the US Agency for International Development (USAID), Foreign, Commonwealth and Development Office (formerly the UK Department for International Development - DFID), the World Bank, the Global Partnership for Education (GPE), the Australian Department of Foreign Affairs and Trade (DFAT), the Australian Council for Educational Research (ACER), and the Bill and Melinda Gates Foundation. These organizations provided critical technical and financial support for the development and field testing of the GPF. UIS, as “the official source of cross-nationally comparable data on education” for the SDGs (Education 2030 Framework for Action, 2015), is the lead organization for this collaborative effort, including through its role in organizing the Global Alliance to Monitor Learning (GAML).

## **PURPOSE OF THE FRAMEWORK**

The overarching purpose of the GPF is to provide countries and regional/international assessment organizations with a common reference or scale, in the form of a common definition of the minimum knowledge and skills learners must demonstrate at key points along their learning trajectory, for reporting progress on indicator 4.1.1 of the SDGs. This indicator commits signatories to tracking the:

*Proportion of children and young people: (a) in grades 2/3 (b) at the end of primary, and (c) at the end of lower secondary achieving at least a minimum proficiency level in (i) reading and (ii) mathematics, by sex.*

The GPF allows the results of different national, regional, or international assessments to be interpreted against a common reference or scale. When countries or jurisdictions link their assessments to the GPF through a process called policy linking, which is outlined in the Policy Linking Toolkit,<sup>1</sup> they are able to set benchmarks for their assessments that allow them to determine the percentage of learners that have partially met, met, or exceeded *Global Minimum Proficiency* for reporting against SDG 4.1.1. This linking of existing - and future – mathematics assessments via a common scale (the GPF) allows for the comparison of results from different assessments, within and across countries; aggregation of country and global mathematics outcomes; and tracking of outcomes over time.

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<sup>1</sup> The Policy Linking Toolkit walks countries and assessment organizations through a step-by-step process for establishing internationally aligned benchmarks or standards for their own assessments. The process uses an internationally recognized methodology called the Modified Angoff.



Although the framework's main purpose is to provide a common reference or scale for global reporting and interpretation of the results of national, regional, and international assessments of mathematics, the framework has proven to be a valuable tool for countries and organizations interested in developing new assessments to measure progress against common, global standards, or in critically examining the extent to which existing curricula are developing skills identified by the international community as critical to supporting learning over time. The GPF also offers countries a lens for examining alignment between their standards, curricula, assessments, teacher training programs, instructional materials, and classroom practices and the minimal learner expectations in the GPF. The use of the GPF for these additional purposes has resulted in deep reflections on the quality of teaching and learning and on the nature of robust assessments.

Finally, many of the partner organizations supporting this initiative, including the US Agency for International Development (USAID), have adjusted their evaluation indicators to align with those of the Sustainable Development Goals, and in particular SDG 4.I.I. The GPF provides these organizations with a valuable tool for monitoring progress over time.

## USING THE FRAMEWORK

The GPF contains five tables:

- **Table 1** outlines the four Global Proficiency Levels (GPLs) and provides brief, general definitions of each of the four levels, as defined by the team of experts (see **Figure 1** above for a depiction of the levels). The four levels apply to all targeted grade levels and to both reading and mathematics (the latter of which is detailed under the Global Proficiency Framework for Mathematics). The *Meets Global Minimum Proficiency* level describes the knowledge and skills learners who have met minimum expectations for SDG Indicator 4.I.I, and for USAID reporting requirements. Although SDG reporting only requires countries to report on the percentage of learners who have met or exceeded this minimum level, the GPF describes the performance of learners at three other levels: *Exceeds Global Minimum Proficiency*, *Partially Meets Global Minimum Proficiency*, and *Below Partially Meets Global Minimum Proficiency*. The GPF team established these additional proficiency levels to help countries and assessment organizations build a more nuanced picture of country progress toward all learners meeting, or exceeding, global minimum proficiency. The framework does not, however, include performance descriptors for the *Below Partially Meets Global Minimum Proficiency* level. Rather, the performance of learners at this level is below benchmarks set for learners in the *Partially Meets Global Minimum Proficiency* level.
- **Table 2** provides an overview of the Mathematics GPF. It outlines the different domains retained and the specific constructs and subconstructs addressed in each domain as well as the grade levels at which they are addressed.

- **Table 3** provides a second, more detailed overview of the GPF. It lists, for each domain, construct, subconstruct, the key knowledge and/or skills<sup>2</sup> addressed, by grade level. This table allows curriculum and evaluation specialists to quickly identify the items on a given assessment that evaluate the knowledge and skills addressed in the GPF. The resulting analysis provides an indication of the degree of alignment between an assessment and the knowledge and skills in the GPF. This process of alignment is the first task, Task I, in the policy linking process, described in detail in the Policy Linking Toolkit.
- **Table 4** summarizes, for each knowledge and skill retained, at each grade level, a description of what in the *Meets Global Minimum Proficiency* level can do (this is called a Global Proficiency Descriptor—GPD). It provides an overview of the progression of knowledge and skills as learners move up the grade levels. The table is particularly useful for governments or assessment organizations interested in establishing a single benchmark for an assessment, namely the minimum score required to meet global minimum proficiency requirements.
- **Table 5** contains the full GPF, with GPDs describing the performance of learners in all four proficiency levels, by grade level for every knowledge and skill retained. This table is particularly useful for governments or assessment organizations interested in establishing multiple benchmarks, corresponding to the lowest performance in each performance category, to provide a more nuanced picture of the percentage of learners in each category.

**Glossary** - A glossary of key terms follows the tables.

**Document Key** – The tables in the document contain the following color codes:

- Black text designates the main content of a domain, construct, subconstruct, knowledge or skill, or GPD.
- Blue, italicized text indicates an example provided to help clarify the GPD.

**Vertical Alignment** – Also, in developing the GPF for Mathematics, the content experts sought to create vertical alignment by having the GPDs for the Grade 1 Exceeds Global Minimum Proficiency Level form the basis for the Grade 2 Meets Global Proficiency Level and the Grade 3 Partially Meets Global Proficiency Framework. Thus, users should see this progression in the document. However, it is important to note that while this progression formed the starting place for the assessment, the experts did make adjustments to reflect norms of when certain knowledge and/or skills are taught.

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<sup>2</sup> Knowledge or skills are sometimes referred to as content standards in countries. However, the authors have deliberately not used this term, as it is expected that countries will have their own national content standards, which may not align directly with this framework. Nonetheless, countries that do not have national content standards or that may wish to revise their standards to better align with global expectations and developmental progressions might use the knowledge or skills presented in this table to guide their discussions and planning. It is also critical to note that well-functioning education systems have content and performance standards that align with one another as well as their curricula, teacher training, materials, classroom instruction, and assessments.

**TABLE I: DEFINITIONS OF THE GLOBAL MINIMUM PROFICIENCY LEVELS**

<b>Global Minimum Proficiency Level</b>	<b>Definition</b>
“Does Not Meet” Global Minimum Proficiency	Learners lack the most basic knowledge and skills. As a result, they generally cannot complete the most basic grade-level tasks.
“Partially Meets” Global Minimum Proficiency	Learners have limited knowledge and skills. As a result, they can partially complete basic grade-level tasks.
“Meets” Global Minimum Proficiency	Learners have developed sufficient knowledge and skills. As a result, they can successfully complete the most basic grade-level tasks.
“Exceeds” Global Minimum Proficiency	Learners have developed superior knowledge and skills. As a result, they can complete complex grade-level tasks.

**TABLE 2: STRUCTURE OF THE GPF**

An 'x' means there are global proficiency descriptors (GPDs) for the grade in question. An 'a' means there are no GPDs for this grade level. Learners are considered to have developed the knowledge and skills for these subconstructs at earlier grade levels.

Domain		Construct		Subconstruct		Grade								
						1	2	3	4	5	6	7	8	9
N	Number and operations	N1	Whole numbers	N1.1	Identify, count in and identify the relative magnitude of whole numbers	x	x	x	x	x	x	a	a	a
				N1.2	Represent whole numbers in equivalent ways	x	x	x	x	x	x	a	a	a
				N1.3	Solve operations using whole numbers	x	x	x	x	x	x	see integers		
				N1.4	Solve real-world problems involving whole numbers	x	x	x	x	x	x	see integers		
		N2	Fractions	N2.1	Identify and represent fractions using objects, pictures, and symbols, and identify relative magnitude			x	x	x	x	x	a	a
				N2.2	Solve operations using fractions				x	x	x	x	a	a
				N2.3	Solve real-world problems involving fractions				x	x	x	x	a	a
		N3	Decimals	N3.1	Identify and represent decimals using objects, pictures, and symbols, and identify relative magnitude					x	x	x	a	a
				N3.2	Represent decimals in equivalent ways (including fractions and percentages)					x	x	x	x	a
				N3.3	Solve operations using decimals					x	x	x	x	a
				N3.4	Solve real-world problems involving decimals						x	x	x	a
		N4	Integers	N4.1	Identify and represent integers using objects, pictures, or symbols, and identify relative magnitude							x	a	a
				N4.2	Solve operations using integers							x	x	a
				N4.3	Solve real-world problems involving integers							x	x	a
		N5	Exponents and roots	N5.1	Identify and represent quantities using exponents and roots, and identify the relative magnitude							x	x	x
				N5.2	Solve operations involving exponents and roots									x
		N6	Operations across number	N6.1	Solve operations involving integers, fractions, decimals, percentages, and exponents								x	x
		M	Measurement	M1	Length, weight, capacity, volume, area and perimeter	M1.1	Use non-standard and standard units to measure, compare, and order	x	x	x	x	x	x	x
M1.2	Solve problems involving measurement								x	x	x	x	x	x
M2	Time			M2.1	Tell time	x	x	x	x	x	a	a	a	a
				M2.2	Solve problems involving time		x	x	x	x	x	x	x	x

Domain		Construct		Subconstruct		Grade									
						1	2	3	4	5	6	7	8	9	
		M3	Currency	M3.1	Use different currency units to create amounts	x	x	x	a	a	a	a	a	a	
G	Geometry	G1	Properties of shapes and figures	G1.1	Recognize and describe shapes and figures	x	x	x	x	x	x	x	x	x	
		G2	Spatial visualizations	G2.1	Compose and decompose shapes and figures	x	x	x		x	x	x	x	x	
		G3	Position and direction	G3.1	Describe the position and direction of objects in space	x	x	x	x	x	x	x	x	x	
S	Statistics and probability	S1	Data Management	S1.1	Retrieve and interpret data presented in displays	x	x	x	x	x	x	x	x	x	
				S1.2	Calculate and interpret central tendency							x	x	x	
		S2	Chance and probability	S2.1	Describe the likelihood of events in different ways					x	x	x	x	x	
				S2.2	Identify permutations and combinations									x	
A	Algebra	A1	Patterns	A1.1	Recognize, describe, extend, and generate patterns	x	x	x	x	x	x	x	a	a	
		A2	Expressions	A2.1	Evaluate, model, and compute with expressions							x	x	x	
		A3	Relations and functions	A3.1	Solve problems involving variation (ratio, proportion, and percentage)							x	x	x	x
				A3.2	Demonstrate an understanding of equivalency	x	x	x	x	x	x	a	a	a	
				A3.3	Solve equations and inequalities								x	x	x
A3.4	Interpret and evaluate functions											x			

**TABLE 3: KEY KNOWLEDGE AND SKILLS, BY GRADE LEVEL**

Domain	Construct	Subconstruct	Knowledge or Skill	Grade												
				1	2	3	4	5	6	7	8	9				
N	Number and operations	N1	Whole numbers	N1.1	Identify, count in and identify the relative magnitude of whole numbers	Count, read, and write whole numbers		x	x	x	x					
						Compare and order whole numbers		x	x	x	x	x				
						Skip count forwards or backwards		x	x	x	x	x				
				N1.2	Represent whole numbers in equivalent ways	Determine or identify the equivalency between whole numbers represented as objects, pictures, and numerals	x	x								
						Use place-value concepts			x	x	x	x				
						Round whole numbers				x	x	x	x			
				N1.3	Solve operations using whole numbers	Add, subtract, multiply and divide whole numbers	x	x	x	x	x	x				
						Find the double or half of a set of objects	x	x								
						Demonstrate fluency with basic addition, subtraction, multiplication and division facts	x	x	x	x						
						Identify factors and multiples of whole numbers		x	x	x	x	x				
				Perform calculations involving two or more operations on whole numbers		x	x	x	x	x						
		N1.4	Solve real-world problems involving whole numbers	Solve real-world problems involving the addition, subtraction, multiplication, and division of whole numbers, including with measurement and currency units	x	x	x	x	x	x						
		N2	Fractions	N2.1	Identify and represent fractions using objects, pictures, and symbols, and identify relative magnitude	Express a visual representation of a fraction (picture, objects) in fractional notation			x	x						
						Identify equivalent fractions, including identifying equivalences between improper fractions and mixed numbers				x	x	x				
Compare and order fractions and mixed numbers, including when they are positive and negative								x	x	x	x					

Domain	Construct	Subconstruct	Knowledge or Skill	Grade										
				1	2	3	4	5	6	7	8	9		
		N2.2	Solve operations using fractions	Add and subtract fractions and mixed numbers				x	x	x	x			
			Multiply and divide fractions by whole numbers, fractions, and mixed numbers					x	x	x				
		N2.3	Solve real-world problems involving fractions	Solve real-world problems involving the addition, subtraction, multiplication, and division of fractions (proper and improper); whole numbers; and mixed numbers				x	x	x	x			
	N3	Decimals	N3.1	Identify and represent decimals using objects, pictures, and symbols, and identify relative magnitude	Identify and represent quantities using decimal notation				x	x	x			
				Compare and order decimal numbers, including when they are positive or negative					x	x	x			
			N3.2	Represent decimals in equivalent ways (including fractions and percentages)	Round decimal numbers					x	x	x		
				Express fractions as decimals and vice versa					x	x	x			
				Compare and order decimals, fractions, and percentages, including when they are positive and negative						x	x	x		
			Express percentages as fractions or mixed numbers (and vice versa)								x	x		
			N3.3	Solve operations using decimals	Add and subtract decimals, including positive and negative decimals					x	x	x		
	Multiply and divide decimals by whole numbers or decimals; divide whole numbers by decimals									x	x			
	N3.4	Solve real-world problems involving decimals	Solve real-world problems involving the addition, subtraction, multiplication, and division of decimals, including currency or money problems						x	x	x			
	N4	Integers	N4.1	Identify and represent integers using	Compare and order integers							x		

Domain	Construct	Subconstruct	Knowledge or Skill	Grade											
				1	2	3	4	5	6	7	8	9			
			objects, pictures, or symbols, and identify relative magnitude												
			N4.2	Solve operations using integers	Multiply and divide integers								x		
				Identify factors and multiples, including common factors and common multiples, of whole numbers							x	x			
		N4.3	Solve real-world problems involving integers	Solve real-world problems involving the addition, subtraction, multiplication, and division of integers								x	x		
		N5	Exponents and roots	N5.1	Identify and represent quantities using exponents and roots, and identify the relative magnitude	Identify the square and cube, and the square and the cube root, of whole numbers							x		
					Identify and represent numbers using scientific notation and exponents								x	x	
					Compare and order numbers expressed in scientific notation								x	x	
		N5.2	Solve operations involving exponents and roots	Add, subtract, multiply, and divide quantities expressed in exponential notation, including scientific notation										x	
		N6	Operations across number	N6.1	Solve operations involving integers, fractions, decimals, percentages, and exponents	Perform calculations involving two or more operations on integers, decimals, fractions, and exponents									x
		M	Measurement	M1	Length, weight, capacity,	M1.1	Use non-standard and standard	Use non-standard units to estimate, measure, and compare length, weight, volume, and capacity	x	x	x				



Domain		Construct		Subconstruct		Knowledge or Skill	Grade										
							1	2	3	4	5	6	7	8	9		
			volume, area and perimeter		units to measure, compare, and order	Use standard units to estimate, measure, and compare the length, weight, capacity, and volume of two objects			x	x							
						Convert between units of measures of length, weight, volume, and capacity within a standard measurement system or between different systems of measurement					x	x	x	x			
						Read scales on a variety of measuring tools involving fractions and decimals					x	x	x				
				M1.2	Solve problems involving measurement	Solve problems involving the perimeter of polygons				x	x	x	x				
						Solve problems involving the circumference of circles									x		
						Solve problems involving the area of rectangles, triangles, or circles or of compound shapes composed of rectangles or triangles				x	x	x	x	x	x		
						Solve problems involving the surface area of a familiar polyhedron									x		
						Solve problems involving the volume of prisms								x	x		
								Solve problems involving the application of Pythagoras' theorem							x		
				M2	Time	M2.1	Tell time	Distinguish between parts of the day, and sequence and describe events in time, using informal comparisons	x								
								Tell time using an analog clock		x	x	x					
								Identify equivalence between analog and digital representations of time					x				
								Identify or solve problems involving equivalences between different units of time		x	x		x				
						M2.2	Solve problems involving time	Solve problems involving the calendar		x							
Solve problems involving elapsed time, including when times are presented in a schedule			x					x	x	x							
Solve problems involving conversions of time: 12-hour and 24-hour time (7), time zones, and different units of time											x	x	x				

Domain		Construct		Subconstruct		Knowledge or Skill	Grade											
							1	2	3	4	5	6	7	8	9			
		M3	Currency	M3.1	Use different currency units to create amounts	Count or or create combinations of currency denominations	x	x	x									
		G1	Propertie s of shapes and figures	G1.1	Recognize and describe shapes and figures	Recognize and name two-dimensional shapes and three-dimensional figures; Distinguish between regular and irregular shapes	x	x	x									
						Identify the attributes of 2-dimensional shapes or 3-dimensional figures				x								
						Classify complex two-dimensional shapes by their defining attributes									x			
						Recognize and name different types of lines						x						
						Recognize and name types of quadrilaterals									x			
						Recognize and name parts of the circle, and identify the relationship between the radius and the diameter											x	
						Recognize angles and estimate their size										x	x	
						Solve problems involving the angle sum of a triangle, or angles formed by intersecting lines or parallel lines intersected by a transverse line											x	x
						Recognize two-dimensional shapes that have been rotated or reflected						x						
						Identify the line of symmetry of two-dimensional shapes							x					
						Recognize and describe the congruence and similarity of two-dimensional shapes							x					
						Recognize two-dimensional shape transformations that are expressed quantitatively or describe and implement such transformations										x	x	x
						G2	Spatial visualizati ons	G2.1	Compose and decompose shapes and figures	Compose larger two-dimensional shapes from smaller shapes; decompose a larger shape into smaller shapes	x	x	x					
		Identify the net of familiar, three dimensional shapes or particular sides represented in a net												x			x	
		Identify different views of three-dimentional shapes, including cross sections													x	x		x

Domain		Construct		Subconstruct		Knowledge or Skill	Grade									
							1	2	3	4	5	6	7	8	9	
S		G3	Position and direction	G3.1	Describe the position and direction of objects in space	Use positional terms, including left and right, to describe the location of an object	x	x	x							
						Use maps, including grid maps with compass directions, to describe locations or give directions			x	x	x					
						Use a Cartesian coordinate system to locate and plot points, describe or calculate distances between locations, and draw shapes						x	x	x		
						Describe or implement transformations							x	x		
	Statistics and probability	S1	Data management	S1.1	Retrieve and interpret data presented in displays	Retrieve information from or solve problems involving data displays (i.e., tally charts, bar graphs, or pictographs) with single or multi-unit scales and up to four categories of data	x	x	x	x	x					
						Construct data displays using categories of data and single- or multi-unit scales				x						
						Retrieve information from, or solve problems involving, data displays with single- or multi-unit scales and categories and sub-categories of data						x				
						Retrieve information from or construct pie charts and Venn diagrams (for categorical data) and line graphs and dot plots (for bivariate data) to represent data							x	x		
						Understand, describe, and use relationships within displays of bivariate data									x	
						Solve problems involving means, medians, and modes, including the effect of outliers on means and medians								x	x	x
		S2	Chance and probability	S2.1	Describe the likelihood of events in different ways	Calculate and interpret central tendency							x	x		
						Compare key features of the distribution of two different but related sets of data, or the distribution of subcategories within a set of data							x	x		
						Identify desirable characteristics of sampling methods									x	
Use words to describe the likelihood of an event happening, or to compare the likelihood of two events happening											x	x				
					Calculate the probability of events happening or place probability values or events on a continuum from 0 (impossible) to 1 (certain)						x					

Domain		Construct		Subconstruct		Knowledge or Skill	Grade													
							1	2	3	4	5	6	7	8	9					
						Identify, or calculate the probability of, specific outcomes of simple or compound events, experimentally or otherwise									x	x				
				S2.2	Identify permutations and combinations	Identify all the possible outcomes (sample space) for a situation involving a compound event comprised of two simple events, with and without replacement										x				
A	Algebra	A1	Patterns	A1.1	Recognize, describe, extend, and generate patterns	Copy, recognize, describe, or extend repeating patterns, or identify missing elements of such patterns	x	x	x											
						Describe increasing or decreasing numerical patterns, or identify missing elements of such patterns														
						Generate a pattern from a given rule or match a pattern to a given rule														
						Recognize and extend non-linear patterns, including squaring patterns, when they are supported or not by a visual representation										x				
		A2	Expressions	A2.1	Evaluate, model, and compute with expressions	Use expressions to represent problem situations with single or multiple variables											x	x		
						Add and subtract linear expressions											x			
						Multiply, divide, simplify, and factor linear expressions												x	x	
						Evaluate, simplify, and factor exponential expressions												x	x	
		A3	Relations and functions	A3.1	Solve problems involving variation (ratio, proportion, and percentage)	Reason proportionally to solve problems involving ratio, when the ratio is expressed informally or formally											x	x		
						Solve problems involving equal ratios												x	x	
				Solve problems involving percentages														x	x	x
				A3.2		Demonstrate an understanding of equivalency	Represent equivalencies using objects and/or pictures	x	x											
Create numerical expressions to model addition, subtraction, multiplication, or division situations																				

Domain		Construct		Subconstruct		Knowledge or Skill	Grade										
							1	2	3	4	5	6	7	8	9		
						Represent real-world problems by number sentences, with a symbol or blank to represent the missing value				x		x					
						Find the missing value in a number sentence			x		x	x					
				A3.3	Solve equations and inequalities	Represent and solve real-world problems involving equations							x	x			
						Graph linear equations, and identify the x-and y-intercepts or the slope of a line										x	
						Represent and solve real-world problems using two linear equations											x
						Solve inequalities											x
				A3.4	Interpret and evaluate functions	Identify a function presented in a graph										x	

**TABLE 4: ‘MEETS MINIMUM PROFICIENCY’ LEVEL DESCRIPTORS**

Domain	Construct	Subconstruct	Global Proficiency Descriptor for 'Meets Global Minimum Proficiency'	Grade																		
				1	2	3	4	5	6	7	8	9										
N	Number and operations	NI	Whole numbers	NI.1 Identify, count in and identify the relative magnitude of whole numbers	Count in whole numbers up to 30.	x																
					Count in whole numbers up to 100.		x															
					Count in whole numbers up to 1000.			x														
					Count in whole numbers up to 10,000.				x													
					Count in whole numbers up to any whole number.					x												
					Read and write whole numbers up to 30 in numerals.	x																
					Read and write whole numbers up to 100 in words and in numerals.		x															
					Read and write whole numbers up to 1000 in words and in numerals.			x														
					Read and write whole numbers up to 10,000 in words and numerals.				x													
					Read and write whole numbers greater than 10,000 in words and numerals.					x												
					Compare and order whole numbers up to 30.	x																
					Compare and order whole numbers up to 100.		x															
					Compare and order whole numbers up to 1000.			x														
					Compare and order whole numbers up to 10,000.				x													
				Compare and order whole numbers up to 100,000.					x													
				Compare and order any whole numbers.						x												
				Skip count forwards by twos or tens.			x															
				Skip count backwards by tens.				x														
				Skip count forwards and backwards by hundreds.					x													
				Skip count forwards and backwards by thousands.						x												
NI.2	Represent whole numbers in equivalent ways	Identify equivalence between whole quantities up to 10 represented as objects, pictures, and numerals (e.g., when given a picture of ten objects and other pictures of various numbers of objects, select the picture that has the same number of objects; or associate a numeral with the appropriate number of objects).	x																			
		Identify and represent the equivalence between whole quantities up to 30 represented as objects, pictures, and numerals (e.g., when given a picture of 30 flowers, identify the picture that has the number of butterflies that would be needed for each flower to have a butterfly; or given a picture of 19 shapes, draw 19 more shapes).		x																		

Domain		Construct		Subconstruct		Global Proficiency Descriptor for 'Meets Global Minimum Proficiency'	Grade												
							1	2	3	4	5	6	7	8	9				
						Use place-value concepts for tens and ones (e.g., compose or decompose a two-digit whole number using a number sentence such as $35 = 3 \text{ tens and } 5 \text{ ones}$ , $35 = 30 + 5$ or using number bonds; determine the value of a digit in the tens and ones place).			x										
						Use place-value concepts for hundreds, tens, and ones (e.g., compose or decompose a three-digit whole number using a number sentence such as $254 = 2 \text{ hundreds, } 5 \text{ tens and } 4 \text{ ones}$ ; $254 = 200 + 50 + 4$ ; determine the value of a digit in the hundreds place).				x									
						Use place-value concepts for thousands, hundreds, tens, and ones (e.g., compose or decompose a four-digit whole number using a number sentence such as $1,383 = 1 \text{ thousand } 3 \text{ hundreds, } 8 \text{ tens and } 3 \text{ ones}$ ; $1383 = 1,000 + 300 + 80 + 3$ ; determine the value of a digit in the thousands place).					x								
						Use place-value concepts beyond the thousands (e.g., compose or decompose a seven-digit whole number using a number sentence such as $1,383,547 = 1 \text{ million, } 3 \text{ hundred thousands, } 8 \text{ ten thousands, } 3 \text{ thousands, } 5 \text{ hundreds, four tens and } 7 \text{ ones}$ ; $1,383,547 = 1,000,000 + 300,000 + 80,000 + 3000 + 500 + 40 + 7$ ; determine the value of a digit in the millions place).						x							
						Round whole numbers to the nearest ten.				x									
						Round whole numbers to the nearest hundred.					x								
						Round whole numbers to the nearest thousand.						x							
				NI.3	Solve operations using whole numbers	Add and subtract within 10 (i.e., where the sum or minuend does not surpass 10), and represent these operations with objects, pictures, or symbols (e.g., $5 + 4 = \underline{\quad}$ ; $7 - 5 = \underline{\quad}$ ; when presented with a picture of three baskets, with the first basket showing 3 bananas and a second basket showing 5 bananas, complete the addition statement $3 + 5 = \underline{\quad}$ or find an appropriate addition statement from a list. Or, when presented with a picture of 6 whole bananas and 3 banana peels, match to sentence $9 - 3 = 6$ or complete statement $9 - 3 = \underline{\quad}$ ).		x											
						Add and subtract within 20 (i.e., where the sum or minuend does not surpass 20), and represent these operations with objects, pictures, or symbols (e.g., $16 - 3 = \underline{\quad}$ ; $12 + 3 = \underline{\quad}$ ; when presented with a picture of 12 marbles with 3 more marbles added, complete or match to			x										

Domain		Construct		Subconstruct		Global Proficiency Descriptor for 'Meets Global Minimum Proficiency'	Grade												
							1	2	3	4	5	6	7	8	9				
						<i>the number sentence <math>12 + 3 = \underline{\quad}</math>. Or, when presented with a picture of a carton that can hold 20 bottles, 7 of which have been removed, complete or match to the subtraction statement <math>20 - 7 = \underline{\quad}</math>.</i>													
						Add and subtract within 1000 (i.e., where the sum or minuend does not surpass 1000), with and without regrouping, and represent these operations with objects, pictures, or symbols (e.g., $550 + 250$ ; $457 - 129$ ; use hundreds grids, number lines, or multibase arithmetic blocks to reason through or solve addition and subtraction problems).				x									
						Add and subtract beyond 1000 (i.e., where the sum or minuend surpasses 1000), with and without regrouping, and represent these operations with objects, pictures, or symbols (e.g., $1457 - 129$ ; use number lines to reason through or solve addition and subtraction problems).					x								
						Demonstrate fluency with addition and subtraction within 20; and add and subtract within 100 (i.e., where the sum or minuend does not surpass 100), with and without regrouping, and represent these operations with objects, pictures, or symbols (e.g., $32 + 59$ ; solve an addition or subtraction problem presented by images of bundles of 10s and ones; use numberlines or skips on hundreds grid to reason through or solve addition and subtraction problems).			x										
						Demonstrate fluency with multiplication facts up to $10 \times 10$ (i.e., $1 \times 1$ up to $10 \times 10$ ) and related division facts, including the relationship between them.				x									
						Find the double of a set of up to 5 objects, and divide a group of up to 10 objects into two equal sets (e.g., <i>There are four biscuits in a package. There are two packages of biscuits. How many biscuits are there in total?; There are 8 biscuits in a package. The biscuits will be shared equally by two friends. How many biscuits will each friend get?</i> ).	x												
						Find the double of a set of up to 10 objects, and divide a group of up to 20 objects into 2 equal sets (e.g., <i>An octopus has 8 legs. There are two octopuses. How many octopus legs are there in total?; There are 16 biscuits. The biscuits will be shared equally by two friends. How many biscuits will each friend get?</i> ).		x											



Domain		Construct		Subconstruct		Global Proficiency Descriptor for 'Meets Global Minimum Proficiency'	Grade												
							1	2	3	4	5	6	7	8	9				
						Identify factors of whole numbers within 100 and multiples of whole numbers within 20 (e.g., <i>find all factors of 84; find multiples of 15</i> ).						x							
						Multiply and divide within 100 (i.e., up to $10 \times 10$ and $100 \div 10$ , without a remainder), and represent these operations with objects, pictures, or symbols (e.g., $72 \div 8$ ; $6 \times 9$ ; solve multiplication problems by using a rectangular array or by repeating groups of the same number of objects; solve division problems by dividing a group of objects into a given number of equal groupings).				x									
						Multiply, with and without regrouping, and divide, with no remainder, any number by a one-digit numbers and multiply two, two-digit numbers, with and without regrouping (e.g., $342 \times 4 = \underline{\quad}$ ; $42 \times 34 = \underline{\quad}$ ; $1380 \div 5 = \underline{\quad}$ ).							x						
						Multiply any number by a two-digit number, with and without regrouping, and divide any number by a one-digit number, with and without a remainder (e.g., $3427 \times 68$ ; $1380 \div 6 = \underline{\quad}$ ).								x					
						Perform calculations involving two or more additions and subtractions, within the limits for meets expectations described above, when order of operations is not a factor (e.g., $14 - 5 + 4 = \underline{\quad}$ ; $17 - 3 - 7 = \underline{\quad}$ ).			x										
						Perform calculations involving two or more operations, within the limits for meets expectations described above, when order of operations is not a factor (e.g., $6 \times 7 + 19 = \underline{\quad}$ ; $6 \times 4 \div 8 = \underline{\quad}$ ).				x									
						Perform calculations involving two or more operations, within the limits for meets expectations described above, when order of operations is not a factor (e.g., $6 \times 7 + 519 = \underline{\quad}$ ; $6 \times 4 \div 8 = \underline{\quad}$ ).					x								
						Perform calculations involving two or more operations, within the limits for meets expectations described above, respecting the order of operations (e.g., $1754 + 53 \times 53 = \underline{\quad}$ ; $4 \times 9 \times 8 = \underline{\quad}$ ).							x						
						Perform calculations involving two or more operations, within the limits for meets expectations described above, respecting the order of operations (e.g., $6584 + 2187 \times 38 = \underline{\quad}$ ; $675 \div 9 \times 652 = \underline{\quad}$ ).								x					

Domain		Construct		Subconstruct		Global Proficiency Descriptor for 'Meets Global Minimum Proficiency'	Grade													
							1	2	3	4	5	6	7	8	9					
				NI.4	Solve real-world problems involving whole numbers	Solve simple real-world problems using addition and subtraction facts within 10 (i.e., where the sum or minuend does not surpass 10) (e.g., <i>There are 7 eggs in a carton. 3 more eggs are put in the carton. How many eggs are in the carton now?; Three eggs in a carton of 10 eggs are cracked. How many eggs are not cracked?</i> ).	x													
						Solve simple real-world problems using addition and subtraction facts within 20 (i.e., where the sum or minuend does not surpass 20) (e.g., <i>There are 15 sheep in a field. 4 more sheep come into the field. How many sheep are in the field now?; There are 16 sheep in a field. 4 go to the stable. How many sheep are left in the field?</i> ).		x												
						Solve simple real-world problems involving addition and subtraction of whole numbers within 100 (i.e., where the sum or minuend does not surpass 100) without regrouping, including problems involving measurement and currency units (e.g., <i>There are 33 sheep in a field. 25 more sheep come into the field. How many sheep are in the field now?; There are 54 children in total in grade 3. Thirteen are absent today. How many grade 3 children are at school today?</i> ).			x											
						Solve simple real-world problems involving addition and subtraction of whole numbers within 100 (i.e., where the sum or minuend does not surpass 100) with and without regrouping, including problems involving measurement and currency units (e.g., <i>There are 34 sheep in a field. 29 more sheep come into the field. How many sheep are in the field now?; There are 54 children in total in grade 4. Seven are absent today. How many grade 4 children are at school today?</i> ).				x										
						Solve simple real-world problems involving the multiplication of two whole numbers to 5, and associated division facts (e.g., <i>Amina is putting fruit into bags. Each bag will contain 4 pieces of fruit. How many bags will Amina need for 20 pieces of fruit?; Amina has 5 bags. Each bag contains 4 pieces of fruit. How many pieces of fruit are there in total?</i> ).					x									
						Solve simple real-world problems involving addition and subtraction of whole numbers within 1000 (i.e., where the sum or minuend does not surpass 1,000) with and without regrouping, including problems involving measurement and currency units (e.g., <i>There</i>						x								

Domain		Construct		Subconstruct		Global Proficiency Descriptor for 'Meets Global Minimum Proficiency'	Grade															
							1	2	3	4	5	6	7	8	9							
						were 740 people living in a town. Eighty-three more people come to live in the town. What is the total number of people living in the town now?; There are 750 people living in a town. Only 327 of them were born in the town. How many were born outside the town?.																
						Solve simple real-world problems involving the multiplication of two whole numbers to 10, and associated division facts (e.g., Amina is putting fruit into bags. Each bag will contain 7 pieces of fruit. How many bags will Amina need for 28 pieces of fruit?; Amina has 4 bags. Each bag contains 7 pieces of fruit. How many pieces of fruit are there in total?).					x											
						Solve real-world problems involving combinations of any <b>two or more</b> of the four operations, including problems involving measurement and currency units and: * addition and subtraction of whole numbers beyond 1000 with and without regrouping * multiplications and divisions of any number by a one-digit number with and without regrouping (multiplication) and with and without a remainder (division) * multiplications of two, two-digit numbers.						x										
		N2	Fractions	N2.1	Identify and represent fractions using objects, pictures and symbols and identify relative magnitude	Compare and order everyday unit fractions (e.g., $1/4$ ; $1/3$ ; $1/2$ ).				x												
						Compare and order fractions with different but related denominators up to 12 (e.g., $2/3$ and $5/6$ ).				x												
						Compare and order fractions and mixed numbers (e.g., $9/6$ , $1\ 1/3$ , $5/12$ , $2\ 1/2$ ).								x								
						Compare and order proper and improper fractions with different, unrelated denominators (e.g., $1/4$ ; $7/10$ ; $5/6$ ).									x							
						Compare and order positive and negative fractions (proper and improper) and mixed numbers (e.g., $-2/3$ , $1/3$ , $5/6$ , $-1\ 1/2$ , $5/9$ ).											x					
						Identify unit fractions with denominators up to 12 (e.g., $1/5$ ; $1/7$ ; $1/8$ ; $1/10$ ) represented as objects or pictures (as part of a whole or part of a set) in fractional notation (e.g., Shade $1/5$ of this shape; indicate $1/6$ of these objects when arranged in a 3 by 6 array).							x									

Domain	Construct	Subconstruct	Global Proficiency Descriptor for 'Meets Global Minimum Proficiency'	Grade											
				1	2	3	4	5	6	7	8	9			
			Identify and express everyday unit fractions (e.g., $1/2$ ; $1/3$ ; $1/4$ ) as equivalent fractions when the fractional notations are accompanied by pictures or objects (e.g., $1/3 = \frac{2}{6}$ when the task is supported by pictures; $1/2 = \frac{3}{6}$ ).				x								
			Identify and express proper fractions as equivalent fractions with denominators up to 12 (e.g., express a fraction in simplest form $6/9 = \frac{2}{3}$ ; $2/10 = \frac{1}{5}$ ; express as a multiple of another $4/5 = 8/10$ ).					x							
			Identify and express improper fractions as equivalent mixed numbers (or vice versa), with pictures or symbols (e.g., represent $9/6$ as $1 \frac{3}{6}$ or $1 \frac{1}{2}$ ; use two arrays or rectangles and coloring to represent $9/6$ ).						x						
			Identify and express proper fractions as equivalent fractions (any denominator) (e.g., $13/25 = 26/50$ ).						x						
		N2.2 Solve operations using fractions	Add and subtract proper fractions with the same denominator when fractions are represented with symbols, and represent such additions with objects or pictures (e.g., $2/3 + 1/3$ ; $3/5 - 1/5$ ; add $2/5$ and $1/5$ , or subtract $3/8$ from $6/8$ using fraction bars).				x								
			Add and subtract proper fractions with different but related denominators (e.g., $2/3 + 1/6$ ; $7/8 - 1/4$ ).					x							
			Add and subtract improper fractions or mixed numbers with different but related denominators (e.g., $2 \frac{2}{3} + 1 \frac{1}{6}$ ; $2 \frac{5}{4} + 5/12$ ).						x						
			Add and subtract improper fractions or mixed numbers with different, unrelated denominators (e.g., $9/4 + 3/9$ ; $3 \frac{1}{6} - 2/5$ ).							x					
			Multiply commonly-used fractions by whole numbers, or divide proper fractions by whole numbers, and represent such operations with objects or pictures (e.g., represent $3/4 \times 12$ with 3 by 4 grid with 3 of the columns colored in; or represent $3/4$ divided by 2 as a $1 \times 1$ grid with one side divided into four equal parts and three blocks colored in and then other side divided into 2 to produce 8 equal blocks with 6 colored in).						x						
			Multiply and divide proper fractions and divide improper fractions by whole numbers, and represent such operations with pictures or symbols (e.g., $2/5 \div 3/5$ ; $3/4 \times 2/6$ ; $7/5 \div 2$ ; represent $3/4 \times 1/2$ as a rectangle split into four equal parts with three parts shaded and each							x					

Domain		Construct		Subconstruct		Global Proficiency Descriptor for 'Meets Global Minimum Proficiency'	Grade														
							1	2	3	4	5	6	7	8	9						
						<i>of the four equal parts split into 2 equal. Note that the smaller shaded sections represent the answer).</i>															
						Multiply and divide fractions (including proper and improper fractions and mixed numbers) (e.g., $\frac{3}{4} \times \frac{7}{6} = \underline{\quad}$ ; $\frac{2}{3} \times 3 \frac{1}{4} = \underline{\quad}$ ; $\frac{4}{5} \div \frac{5}{3} = \underline{\quad}$ ).													x		
				N2.3	Solve real-world problems involving fractions	Solve real-world problems involving addition and subtraction of proper fractions with the same denominators (e.g., <i>Paola has <math>\frac{2}{5}</math> of a chocolate bar left. Her friend Carola has <math>\frac{1}{5}</math>th of the same chocolate bar. Together, they have what fraction of the chocolate bar?; Paola ate <math>\frac{2}{5}</math> of a chocolate bar at recess. How much of the chocolate bar is left?</i> ).					x										
						Solve real-world problems involving addition and subtraction of proper fractions with different but related denominators (e.g., <i>Paola has <math>\frac{2}{5}</math> of a chocolate bar left. Her friend Carola has <math>\frac{3}{10}</math> of the same chocolate bar. Together, they have what fraction of the chocolate bar?; Paola has <math>\frac{2}{3}</math> of a chocolate bar left. If she gives her friend Carola <math>\frac{1}{6}</math> of what remains, what fraction of the chocolate bar will Paola have left?</i> ).							x								
						Solve real-world problems involving the multiplication and division of a proper fraction and a whole number (e.g., <i>Misha has half a pizza. If she shares it with her brother, what fraction of the original pizza will each receive?</i> ).								x							
						Solve real-world problems involving addition and subtraction of improper fractions and mixed numbers with different but related denominators (e.g., <i>Maya is cutting some oranges for a picnic. She cuts each orange into 8 equal pieces. She puts 25 pieces of orange onto a large plate and 11 pieces of orange onto a smaller plate. What is the smallest number of whole oranges Maya could have cut?; A tree is now 3 and a half meters tall. When it was planted, it was 1 and one quarter meters tall. By how many meters has the tree grown since it was planted?</i> ).															x
						Solve real-world problems involving the multiplication of two proper fractions or the division of an improper fraction or mixed number by a whole number (e.g., <i>Misha has half a pizza. If she shares it equally with her</i>															x

Domain		Construct		Subconstruct		Global Proficiency Descriptor for 'Meets Global Minimum Proficiency'	Grade																
							1	2	3	4	5	6	7	8	9								
						<i>brother, what fraction of the original pizza will each receive?).</i>																	
						Solve real-world problems involving the addition and subtraction of proper and improper fractions and mixed numbers with unrelated denominators (e.g., <i>A carpenter has a piece of wood that measures 15 and 7/8 ft. She only needs a piece that measures 10 and 5/12 ft. What is the length of the piece of wood she should cut off the long piece?).</i>																	
						Solve real-world problems involving the multiplication and division of fractions (including proper and improper fractions and mixed numbers) (e.g., <i>A cake needs 1 and a half cups of flour. How much is needed to make half a cake?; Dean has a piece of wood that is 3/4 of a foot in length. He needs to cut it into pieces that are 1/16th of a foot long. How many pieces can he cut?.</i>																	
		N3	Decimals	N3.1	Identify and represent decimals using objects, pictures and symbols and identify relative magnitude	Identify and represent quantities using decimal notation (i.e., symbols) up to the tenths place (e.g., <i>identify that 0.8 is 8 tenths</i> ).																	
						Identify and represent quantities using decimal notation up to the hundredths place (e.g., <i>identify that 0.65 is 65 hundredths</i> ).																	
						Identify and represent quantities using decimal notation beyond the hundredths place (e.g., <i>identify that 0.655 is 655 thousandths</i> ).																	
						Compare and order decimal numbers up to the tenths place (e.g., <i>sort the following decimals from high to low: 0.8, 0.3, 0.1</i> ).																	
						Compare and order decimal numbers up to the hundredths place (e.g., <i>sort the following decimals from high to low: 0.8, 0.33, 0.08, 0.6</i> ).																	
						Compare and order decimal numbers beyond the hundredths place (e.g., <i>sort the following decimals from low to high: 0.821, 0.33, 0.08, 0.698, 0.7</i> ).																	
						Compare and order positive and negative decimal numbers, including those beyond the thousandths place (e.g., <i>compare +0.821, -0.33, -0.08, +0.698, +0.7</i> ).																	
				N3.2	Represent decimals in			Round decimal numbers to the nearest tenths place (e.g., <i>round 3.46 to 3.5</i> ).															

Domain		Construct		Subconstruct		Global Proficiency Descriptor for 'Meets Global Minimum Proficiency'	Grade																
							1	2	3	4	5	6	7	8	9								
				equivalent ways (including fractions and percentages)		Round decimal numbers to the nearest hundredths place (e.g., round 3.456 to 3.46).						x											
						Round decimal numbers to any place value beyond the hundredths place (e.g., round 3.45619 to 3.4562).										x							
						Identify and express fractions with denominators of 10 using decimal notation (e.g., $7/10 = 0.7$ ).									x								
						Identify and express fractions with denominators of 100 and everyday fractions, using decimal notation, and represent fractions with denominators of 100 as percentages (e.g., $3/4 = 0.75$ ; $72/100 = 0.72 = 72%$ ).											x						
						Identify and express fractions with any denominator using decimal notation and vice versa (e.g., $752/1000 = 0.752$ ; $7/8 = 0.875$ ).																	x
						Identify and express percentages as fractions with denominators of 10 or 100 or as decimals and vice versa (e.g., $80% = 80/100$ or $8/10$ ; $75% = 0.75$ ).																	x
						Identify and express percentages less than 1% and greater than 100% as fractions or mixed numbers and vice versa (e.g., $124% = 1\ 24/100$ ; $0.2% = 2/1000$ ).																	x
						Compare and order decimals (to hundredths place) and proper fractions (e.g., place a list of decimals and proper fractions on a number line).																	x
						Compare and order fractions, decimals, and percentages (e.g., place these numbers on a number line: 0.4, 1/2, 0.50%, 4/5, 0.25, 1/3, 0.25%).																	x
						Compare and order positive and negative decimals and fractions (e.g., place these numbers on a number line from -1 to +1: -0.4, +1/2, -4/5, 0.25, -1/3, 3/4).																	x
				N3.3	Solve operations using decimals		Add and subtract decimal numbers up to the tenths place. Create or identify concrete or picture models to represent such additions (e.g., $0.5 + 0.2$ ).										x						
							Add and subtract decimal numbers up to the hundredths place. Create or identify concrete or picture models to represent such additions (e.g., $3.41 + 5.3$ ).																x
							Add and subtract any positive and negative decimal numbers.																x
							Multiply and divide a decimal number by a whole number.																x
							Multiply and divide two decimal numbers and divide a whole number by a decimal.																

Domain		Construct		Subconstruct		Global Proficiency Descriptor for 'Meets Global Minimum Proficiency'	Grade													
							1	2	3	4	5	6	7	8	9					
				N3.4	Solve real-world problems involving decimals	Solve real-world problems involving the addition and subtraction of decimals to the tenths place (e.g., <i>Diego has 3.2 meters of roof sheeting. If he buys another 1.4 meters, how many meters of roof sheeting will he have altogether? Aminata has 32.5 kg of grout for tiling. If she uses 12.1 kg for a new project, how many kgs of tile grout will she have left?</i> ).							x							
						Solve real-world problems involving addition and subtraction of decimals beyond the tenths place (e.g., <i>Aria has a height of 1.55 meters. Her mother has a height of 1.63 meters. How much taller than Aria is her mother? Adwoa has 1.64 meters of roof sheeting and another 1.4 meters. How many meters of roof sheeting does she have?</i> ).										x				
						Solve real-world problems involving the multiplication or division of a decimal by a whole number (e.g., <i>Misha buys 4 bags of sugar. Each bag holds 1.5 kg. How many kilos of sugar did he buy? Saira has 2.4 kg of sugar. She wants to separate the sugar into three bags of equal size. How many kgs should she put in each bag?</i> ).											x			
						Solve real-world problems involving the multiplication or division of two decimal numbers (e.g., <i>Pascal has seven .75 liter containers of olive oil. He sells half of them. How many liters of olive oil did he sell? Or Sheila buys a 4.5 liter barrel of olive oil. She sells them in 0.75 liter containers. How many containers can she make with the 4.5 liter barrel?</i> ).													x	
	N4	Integers	N4.1	Identify and represent integers using objects, pictures or symbols and identify relative magnitude	Compare and order integers (e.g., order the following from smallest to largest: -4, 6, -9, 2).															
					N4.2	Solve operations using integers	Multiply any two positive integers, with and without regrouping, and divide any integer by a two-digit number, with and without a remainder (e.g., $2342 \times 1478$ ; $3388 \div 15 = \underline{\quad}$ ).													
			Perform calculations involving two or more operations with positive integers, within the limits for meets expectations described above, respecting the order of																	



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						operations (e.g., $(6584 + 2187) \times 318 = \underline{\quad}$ ; $(9675 - 823) \div 19 = \underline{\quad}$ ).																	
						Perform calculations involving operations with negative integers.										x							
						Identify factors of whole numbers beyond 100 and multiples of whole numbers beyond 20 (e.g., <i>find factors of 125 or find multiples of 25</i> ).											x						
						Identify common factors and common multiples of two numbers (e.g., <i>find the lowest common multiple and the greatest common factor of 12 and 16</i> ).												x					
				N4.3	Solve real-world problems involving integers	Solve real-world problems involving combinations of any two or more of the four operations, including problems involving measurement and currency units and: * addition and subtraction of any integers * multiplication of any positive integers * division of any positive integers by a positive two-digit number with or without a remainder (e.g., <i>The temperature last night was -3 C. This morning it was +2C. What was the change in temperature between last night and this morning?</i> ).											x						
						Solve real-world problems involving the multiplication or division of two integers, including at least one negative integer (e.g., <i>it is -8 degrees Celsius on Tuesday. On Wednesday, it is three times colder. What is the temperature on Wednesday?</i> ).													x				
				N5	Exponents and roots	N5.1	Identify and represent quantities using exponents and roots and identify the relative magnitude	Identify the square, cube, square root, and cube root of whole numbers using pictures and symbols, and represent a square or cube number using exponential notation (e.g., <i>use square arrays or grids to represent square numbers or identify the square of a number; identify the square of 8 or the square root of 81; represent 64 as 8<sup>2</sup></i> ).												x			
								Identify and represent very large whole numbers using scientific notation and positive exponents (e.g., $600 = 6 \times 10^2$ ).														x	
								Identify and represent very small numbers using scientific notation and negative exponents (e.g., $0.065 = 6.5 \times 10^{-2}$ ).															

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						Compare and order large numbers expressed in scientific notation (e.g., $3.1 \times 10^5$ , $9.2 \times 10^5$ , $2.7 \times 10^3$ ; $6.1 \times 10^2$ ).										x				
						Compare and order large and small numbers expressed in scientific notation (e.g., $3.1 \times 10^5$ , $9.2 \times 10^{-5}$ , $2.7 \times 10^3$ ; $6.1 \times 10^{-2}$ ).												x		
				N5.2	Solve operations involving exponents and roots	Add and subtract quantities expressed in exponential notation (e.g., $3^2 + 3^5 = \underline{\quad}$ , including scientific notation).														x
						Multiply and divide quantities expressed in exponential notation, including scientific notation (e.g., $3^5 \div 3^2$ or $4^3 \times 4^2$ ).														
		N6	Operations across number	N6.1	Solve operations involving integers, fractions, decimals, percentages, and exponents	Perform calculations involving two or more operations of integers, decimals, and fractions, within the limits for meets expectations described above, respecting the order of operations.												x		
						Perform calculations involving two or more operations of integers, decimals, fractions, and exponents, within the limits for meets expectations described above, respecting the order of operations.														
M	Measurement	M1	Length, weight, capacity, volume, area and perimeter	M1.1	Use non-standard and standard units to measure, compare, and order	Measure the length of objects using non-standard units (e.g., identify that the pencil is 5 paperclips long).	x													
						Use non-standard units to estimate and compare the length of objects (e.g., identify that the red pencil is 4 paperclips long and the black pencil is 6 paperclips long).		x												
						Use standard units to compare length and weight when provided the unit of measurement (e.g., identify that the pencil is one centimeter longer than the crayon).			x											
						Use non-standard units to estimate or measure volume/capacity (e.g., identify which container would hold the most sand or which box would hold most balls given pictures of these items).				x										
						Select and use appropriate standard units to estimate, measure, and compare length and weight when measurements involve whole numbers only (e.g., choose centimeters instead of meters to measure a pencil; estimate the weight of the apple when given the following choices: A. 5g B. 200g C. 1kg D. 5kg).					x									
						Select and use appropriate standard units to measure and compare capacity/volume when measurements involve whole numbers only (e.g., the measuring cups contain 200 ml of water and 100 ml of oil).						x								

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						Identify the relationship between the relative size of adjacent units within a standard system of measurement for length and weight (e.g., identify the number of millimeters in a centimeter).					x								
						Identify the relationship between the relative size of adjacent units within a standard system of measurement for capacity/volume (e.g., identify the number of pints in a quart).					x								
						Read scales to the nearest marked increment on a variety of measuring tools involving fractions and decimals to the tenths place, containing both labeled and unlabeled scale increments (e.g., read a kitchen scale containing increments expressed as fractions).					x								
						Read scales to the nearest marked increment on a variety of measuring tools involving decimals to the hundredths place, containing both labeled and unlabeled scale increments (e.g., read a depth gauge in a dam with scale increments increasing in 25-centimeter intervals and labels expressed as decimal meters e.g., 1.25, 1.5, 1.75, 2.0, when the needle is pointing directly at a marked increment of the scale).						x							
						Read scales on a variety of measuring tools by reading between marked scale increments (interpolating) (e.g., read a kitchen scale marked in grams and kilograms with some unlabeled scale markings and needle pointing between two unlabeled scale markings; measure an angle using a protractor/angle measurer).							x						
						Make conversions between non-adjacent units of length and weight within a standard system of measurement (e.g., convert kilometers to millimeters).							x						
						Make conversions between non-adjacent units of capacity/volume within a standard system of measurement (e.g., convert pints to gallons).							x						
						Make conversions between adjacent units of length and weight within a standard system of measurement (e.g., identify that the 16 centimeter pencil is 160 millimeters long).						x							
						Make conversions between adjacent units of capacity/volume within a standard system of measurement (e.g., identify that there are four pints in a two-quart container).						x							

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						Make conversions of units of length and weight between different systems of measurement when the conversion factor is provided (e.g., convert 12 cm to inches given 1 inch is 2.54cm, or convert pounds to kilograms given 1 pound is 0.45 kg).										x		
						Make conversions of units of capacity/volume between different systems of measurement where the conversion factor is provided (e.g., convert 750 milliliters to pints given 1 pint is 473 mL).										x		
				MI.2	Solve problems involving measurement	Calculate the perimeter of a polygon.				x								
						Solve problems, including real-world problems, involving the area of a rectangle using concrete or pictorial representations of units (e.g. grid squares or tiles).					x							
						Solve problems, including real-world problems, involving the perimeter of a polygon.						x						
						Solve problems, including real-world problems, involving the calculation of the area of a rectangle.						x						
						Solve problems, including real-world problems, involving comparing the perimeters of polygons.							x					
						Solve problems, including real-world problems, involving the area of compound shapes comprised of rectangles using concrete or pictorial representations of units (e.g., grid squares or tiles).								x				
						Solve problems, including real-world problems, involving perimeter in which a length is unknown (e.g., identify the fifth length in a picture of an irregular pentagon with four sides labeled with length and a given perimeter).									x			
						Solve problems, including real-world problems, involving the calculation of the area of compound shapes comprised of rectangles (e.g., calculate the area of a compound L-shape given a picture with the lengths of all sides provided).										x		
						Solve problems, including real-world problems, involving the calculation of the area of a triangle (e.g., work out the area of a triangle with base length and height given).											x	
						Solve problems, including real-world problems, involving the calculation of the area of compound shapes comprising rectangles and triangles (e.g., calculate the area of a composite shape given a picture of												x

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						<i>the shape made up of a rectangle connected to a right-angled triangle with the lengths of all sides provided).</i>																
						Solve problems, including real-world problems, involving the calculation of the volume of a rectangular prism (e.g., <i>calculate the volume in cubic centimeters of a box with a length of 10 cm, width of 10 cm and height of 15 cm).</i>												x				
						Solve problems, including real-world problems, involving the calculation of the circumference of a circle given the diameter or radius and vice versa.													x			
						Solve problems, including real-world problems, involving the calculation of the area of a circle given the diameter or radius and vice versa.													x			
						Solve problems, including real-world problems, involving the calculation of the surface area of a familiar polyhedron (i.e., a rectangular prism, square-based pyramid, triangular prism) (e.g., <i>calculate the surface area in square centimeters of a box with a length of 10 cm, width of 10 cm and height of 15 cm).</i>													x			
						Solve problems, including real-world problems, involving calculating the volume of a non-rectangular prism, given its dimensions (e.g., <i>calculate the volume of a regular triangular prism, with the length of one side of the base and its height provided).</i>													x			
						Solve problems, including real-world problems, involving application of Pythagoras' theorem.													x			
		M2	Time	M2.1	Tell time	Identify, sequence, and describe activities/events that take place at different parts of the day (e.g., <i>morning and afternoon).</i>	x															
						Tell time using an analog clock to the nearest hour.		x														
						Tell time using an analog clock to the nearest half hour.			x													
						Tell time using an analog clock to the nearest minute.				x												
						Recognize the number of days in a week and months in a year.			x													
						Recognize the number of hours in a day, minutes in an hour, and seconds in a minute.				x												
						Recognize equivalence between representations of time (e.g., <i>digital, analog, and written; 15 minutes is a quarter of an hour).</i>								x								

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				M2.2	Solve problems involving time	Solve problems, including real-world problems, using a calendar (e.g., given a calendar, answer the question: <i>March 2 falls on what day of the week?</i> ).		x											
						Solve problems, including real-world problems, involving elapsed time in hours and half-hours (e.g., calculate the difference between 2:00 and 5:30 or the difference between 16:00 and 16:30).				x									
						Solve problems, including real-world problems, involving elapsed time in minutes within an hour (e.g., calculate the difference between 3:42 and 3:56 or the difference between 16:35 and 16:52).					x								
						Solve problems, including real world problems, involving elapsed time in minutes across hours (e.g., calculate the difference between 3:24 and 5:12 or the difference between 16:35 and 18:22), including problems involving schedules (i.e., timetables, agendas, itineraries).						x							
						Solve problems, including real-world problems, involving the number of days in a week, months in a year, hours in a day, minutes in an hour, and seconds in a minute.						x							
						Solve problems, including real-world problems, involving elapsed time across AM and PM in countries that teach 12-hour time (e.g., calculate the difference between 10:30am and 3:15pm).							x						
						Solve problems, including real-world problems, involving conversion between 12-hour and 24-hour time (e.g., A ferry departs at 1630 hours. It takes 2 hours and 15 minutes to reach its destination. At what time does the ferry arrive at its destination? Give your answer in am/pm time).									x				
						Solve problems, including real-world problems, involving time zones (e.g., When it is 4pm on Tuesday in New York, it is 6 am on Wednesday in Sydney. When it is 11 am on Thursday in Sydney, what time and day will it be in New York?).											x		
						Solve problems, including real-world problems, involving conversion between years, months, weeks, days, hours, fractions of hours or minutes (e.g., Ali spends 2 hours per week practicing piano. How many days per year does he spend practicing piano?).													x
	M3	Currency	M3.1	Use different currency units	Count simple combinations of two commonly used currency denominations in a country.	x													

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G	Geometry	GI	Properties of shapes and figures	GI.1	Recognize and describe shapes and figures	to create amounts		x															
						Count combinations of commonly used currency denominations.		x															
						Combine commonly used currency denominations to make a specified amount.		x															
						Combine commonly used currency denominations to make a specified amount in a variety of ways.			x														
						Recognize and name basic shapes (e.g., recognize a picture of a square, circle, rectangle, or triangle or name a shape when it is pointed to).	x																
						Recognize and name shapes that are regular and irregular (e.g., if shown an irregular triangle, recognize that it is a triangle; name a hexagon).		x															
						Recognize and name straight and curved lines and attributes of shapes (e.g., number of sides, number of corners).		x															
						Recognize when a two-dimensional shape has been rotated or reflected (e.g., when shown a number of shapes, identify those that are the same, even when some are rotated or reflected).		x															
						Recognize and name two-dimensional shapes and familiar three-dimensional figures in everyday life.			x														
						Recognize and name two-dimensional shapes by a written or spoken description of their simple attributes (e.g., name a shape given a description of the number of sides or corners or the relative length of the sides, etc.).				x													
						Recognize and describe the congruence and similarity of two-dimensional shapes (e.g., when shown two shapes, explain how they are similar using mathematical or non-mathematical language - 'It got bigger and has been turned' or 'It's been enlarged and rotated').					x												
Recognize and name types of triangles (e.g., isosceles, scalene, equilateral, and right angle).						x																	
Recognize and name three-dimensional figures by their attributes (i.e., faces, edges, vertices).							x																
Recognize types of angles by their magnitude (e.g., right, straight, acute, obtuse).								x															
Recognize and name types of quadrilaterals (e.g., parallelogram; trapezium, etc.).											x												

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						Recognize single-step two-dimensional shape transformations expressed quantitatively (i.e., rotation by a given fraction of a turn, reflection along a given mirror line, or enlargement by a given scale factor).								x				
						Recognize and name parts of the circle (i.e., radius, diameter, circumference) and identify the relationship between the radius and diameter.										x		
						Identify a line of symmetry in two-dimensional shapes.			x									
						Identify parallel and perpendicular sides of shapes.							x					
						Use the defining attributes (i.e., type of angle, parallel and perpendicular lines) of complex two-dimensional shapes to classify them.									x			
						Use the angle relationships associated with intersecting lines, and with parallel lines intersected by a transverse line to solve problems (e.g., calculate missing angles on a diagram with parallel and intersecting lines).												x
						Estimate the size of angles by comparing to reference/benchmark angles (e.g., estimate the size of a given angle with reference to the fact that it is smaller than a right angle and larger than 45°).										x		
						Use the angle sum of a triangle to solve problems (e.g., determine the missing angle of a triangle where two angles are given).												x
						Describe and implement two-dimensional shape transformations (i.e., reflection, rotation, translation, enlargement/reduction).												x
						Describe and implement sequential two-dimensional shape transformations (i.e., reflection, rotation, translation, enlargement/reduction).												x
G2	Spatial visualizations	G2.1	Compose and decompose shapes and figures	Compose a larger two-dimensional shape from a small number of given shapes when the outlines for the shapes are provided (e.g., use the smaller shapes to make the larger shape).		x												
				Compose/decompose a larger two-dimensional shape from a small number of given shapes without lines showing where the shapes go (e.g., use the smaller shapes to make the larger shape).			x											



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						Use a small number of given shapes to compose multiple larger two-dimensional shapes (e.g., identify which of these larger shapes can be made from the smaller shapes?) and decompose a larger shape into a given number of smaller shapes (e.g., draw one line on the triangle below to show how it can be cut into exactly two smaller triangles).			x									
						Identify the net of a cube or specific faces on the net of a cube (e.g., fold mentally to answer the question, which of these is the net of a cube?; identify opposite faces on a net).					x							
						Identify front, top, and side views of a familiar three-dimensional figure (i.e. prism, cylinder, cone or pyramid) (e.g., identify that the top view of an upright cylinder is a circle).						x						
						Identify alternate views of the same compound or irregular three-dimensional shape, such as its front, top and side view, a rotated view, or a view of a hidden side (e.g., label images (i), (ii), and (iii) as the front, top and side view of the three-dimensional shape).							x					
						Identify the net of a familiar three-dimensional figure (i.e. prism, cylinder, cone, or pyramid) (e.g., fold or unfold mentally to answer the question, 'What figure does this make when folded?'; 'What figure does this make when unfolded?').											x	
						Identify a cross-section of a familiar three-dimensional figure (i.e. prism, cylinder, cone, or pyramid) (e.g., identify that the cross section of a cylinder that is not parallel to the base is an ellipse).												x
		G3	Position and direction	G3.1	Describe the position and direction of objects in space	Use familiar positional terms (e.g., answer the question, 'Where is the book?' by saying, 'The book is next to the pencil').	x											
						Recognize and use positional terms that describe the location of an object with more precision (e.g., answer the question, 'Where is the book?' by saying, 'The book is between the pencil and the bag.').		x										

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						Accurately use the terms left and right, and use simple maps to describe locations using positional terms (e.g., answer, 'Where is the teacher's desk?' To the (left) of the chalkboard).			x									
						Use different kinds of simple maps (e.g., an alpha-numeric map, grid map, or local equivalent) to give and follow 2-step directions to a given location (e.g., Using this map, if you are at the school, you walk towards the tree, and turn left. What would you be facing?; Using this map, how do you get from the school to the green house?).				x								
						Use a grid map with compass directions when the grid dimensions are given in terms of the real-world distance (e.g., Which of these is closest to the distance between the park and Juan's house? A. 100 meters B. 150 meters C. 200 meters D. 250 meters).					x							
						Locate and plot points on a plane in the first quadrant of a Cartesian coordinate system.						x						
						Locate and plot points on a plane in all four quadrants of a Cartesian coordinate system.									x			
						Draw shapes in the first quadrant of a Cartesian coordinate system, and find missing points (e.g., if (1,1), (1,3) and (1,2) are three corners of a rectangle, identify the fourth corner?).									x			
						Draw shapes in all 4 quadrants of a Cartesian coordinate system, and find missing points (e.g., If (1,2), (-3,2) and (-3,-2) are three corners of a square, what is the fourth corner?).												x
						Identify horizontal and/or vertical distances between two points in the first quadrant of the Cartesian coordinate system (e.g., using the Cartesian coordinate system, identify how many horizontal and vertical units is (1,1) from (3,4)).									x			
						Describe and implement a single transformation (i.e., reflection, rotation, translation, enlargement/reduction) of a two-dimensional shape in all four quadrants of a Cartesian coordinate system.												x

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S	Statistics and probability	SI	Data Management	SI.1	Retrieve and interpret data presented in displays	Retrieve information about a single category from a tally chart, bar graph, or pictograph with up to four categories and a single-unit scale (e.g., <i>How many children liked red on this bar graph?</i> ).	x												
						Retrieve information from data displays that arrange data into categories and sub-categories with a single- or multi-unit scale (e.g., <i>How many girls liked green in this bar chart?</i> ).						x							
						Retrieve categorical data from pie charts and Venn diagrams and bivariate data from line graphs and dot plots.										x			
						Compare between categories of a tally chart, bar graph, or pictograph with up to four categories and a single-unit scale, using terms such as more than, less than, etc. (e.g., <i>Which color was chosen less often than green on this bar graph?</i> ).		x											
						Solve a problem involving the sum of or difference between two specified categories of a tally chart, bar graph, or pictograph with a single-unit scale (e.g., <i>How many children like red and blue in this bar graph?</i> ).			x										

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						Solve a problem involving more than two pieces of information from a tally chart, bar graph, or pictograph with a single-unit scale (e.g., <i>How many children were asked about their favorite color in this bar graph?</i> ).					x							
						Complete missing information in a tally chart, bar graph, or pictograph that arranges data into categories and uses a single-unit scale (e.g., <i>add a row or column to a partially completed pictograph</i> ).					x							
						Retrieve information from a tally chart, bar graph, or pictograph with a multi-unit scale.					x							
						Organize data and construct a tally chart, bar graph, or pictograph that arranges data into categories and uses a single- or multi-unit scale.						x						
						Organize data and construct pie charts and Venn diagrams (categorical data), and line graphs and dot plots (bivariate data) when some support is provided (e.g., <i>construct a line graph when given labeled horizontal and/or vertical axes, or match a table to the correct pie chart given a range of pie chart options</i> ).												x
						Compare by calculating differences between categories in a tally chart, bar graph, or pictograph with a multi-unit scale.						x						
						Understand, describe, and use relationships within displays of bivariate data (e.g., <i>describe the strength of association shown in a scatter plot, or a linear relationship between two functionally related variables</i> ).												x
				S1.2	Calculate and interpret central tendency	Solve problems, including real-world problems, involving calculation of the mean, median, or mode of a set of data.												x
						Compare key features of the distribution of two different but related sets of data (e.g., <i>compare the heights of 10 Grade 4 students to the heights of 10 Grade 7 students with reference to minimum value, maximum value, and spread of the data</i> ).												

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						Describe the effect of adding or removing a specific data value on the mean, median, or mode of a set of data (e.g., What would be the effect of removing a score of 20 from the scores 20, 80, 70 and 75 on the mean? and the possible answers are a) it would increase; b) it would decrease; c) it would stay the same. The same question can be asked about the effect on the median and the mode. Another example is Juanita plays hockey and aims to achieve a mean of 3 goals per game by the end of the season. Her goals for the first four games are shown: 2, 4, 1, 3. She has one more game to play this season. How many goals must she score in this game to achieve her aim?).										x					
						Compare the distribution of sub-categories within a set of data (e.g., compare temperatures in a 24-hour period split into day temperatures and night temperatures).												x			
						Determine and compare the mean, median, and mode for different sets of data and choose which is most appropriate in a given context (e.g., determine why the median is more appropriate than the mean as a representation of house prices in a given area).														x	
						Recognize the effect of outliers in a set of data on the mean and median.														x	
						Identify desirable characteristics of sampling methods that will enable the mean of a sample to be as close as possible to the mean of a population (e.g., Anoush wants to determine the mean number of siblings each student in her school has. She decides to ask a sample of students. For which of these samples will the mean of the sample be closest to the mean of the whole school? A) The first 10 students she sees in the corridor, B) All the students in her football team, C) Fifty Grade 7 students selected randomly, and D) Fifty students from various grade levels selected randomly).															x
						Identify the likelihood of an event happening as likely or unlikely (e.g., There are 9 blue, 1 red, 1 green, 1 yellow marbles in a bag. Which color is likely to be selected?).										x					
S2	Chance and probability	S2.1	Describe the likelihood of events in different ways	Compare the likelihoods of two or more events happening, using descriptive words (e.g., Given a picture of a spinner with five equal colored sections - red, blue, yellow, green and purple, the question is: 'If the spinner is spun two times, what is the chance that it will land on blue										x							

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							1	2	3	4	5	6	7	8	9				
						<i>both times?,' and the possible answers are A) impossible, B) unlikely, C) likely, and D) certain).</i>													
						Calculate the probability of a simple event happening, with the answer expressed as a fraction, decimal, or percentage, and place probability values or events on a continuum from 0 (impossible) to 1 (certain), with 0.5 meaning equal chance of occurring or not occurring. (e.g., <i>What is the probability of rolling a 6 on a standard number dice?</i> ).									x				
						Find the expected number of occurrences of a specific independent outcome when a probability experiment is repeated many times (e.g., <i>calculate the expected number of heads with 50 flips of a fair coin</i> ).											x		
						Calculate probabilities of different outcomes for compound events containing two simple events, when they can be listed as a discrete sample space (e.g., <i>calculate the chance of rolling a sum of 7 when rolling two standard number dice</i> ).													x
						Use a wide range of representations such as tree diagrams and two-way tables to explore possible outcomes of chance events and experiments involving multiple compound events (containing 2 or more simple events).													x
				S2.2	Identify permutations and combinations	Systematically count all the possible outcomes (sample space) for a situation involving a compound event comprised of two simple events with replacement (e.g., <i>calculate all of the possible outcomes when selecting a marble from a bag containing 5 marbles, then selecting a second marble after putting the first marble back in the bag</i> ) and without replacement (e.g., <i>calculate all of the possible outcomes when selecting a card randomly from a set containing one yellow, one blue, one red, and one green card, then selecting a second card without putting the first card back into the set</i> ).													x
A	Algebra	A1	Patterns	A1.1	Recognize, describe, extend and generate patterns	Copy repeating patterns of items such as colors, shapes, and sounds (e.g., <i>when provided <math>\square \square \square</math>, select another pattern that is similar to that one, e.g., red, blue, red, blue, red, blue. Or, when someone claps a simple repeated rhythm, 'clap; clap clap; clap; clap clap; clap; clap clap', continue the rhythm</i> ).	x												

Domain		Construct		Subconstruct		Global Proficiency Descriptor for 'Meets Global Minimum Proficiency'	Grade											
							1	2	3	4	5	6	7	8	9			
						Recognize repeating sets in a pattern and use this to identify a missing element and extend the pattern (e.g., identify that $\square\square$ is the repeating set in $\square\square\square\square\square\square$ ; identify the missing element in the following set $\square\square\square\square\_ \square\square$ ; when presented with $\square\square\square\square\square\square$ , add two additional sets to the pattern).		x										
						Describe repeating patterns (e.g., explain that $\square\square$ repeats three times in the following set $\square\square\square\square\square\square$ ; explain that 1, 2, 3, 4 repeats three times in the following set 1, 2, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4).			x									
						Describe numerical patterns that increase or decrease by a constant value with a simple rule, and use this information to identify a missing element or extend the pattern (e.g., describe the pattern 6, 9, 12, 15 as going up by 3s; identify the missing element in the pattern 3, 7, 11, __, 19; extend the pattern 6, 11, 16, 21, ).				x								
						Describe numerical patterns that increase or decrease by a constant multiplier, and use this information to identify a missing element or extend the pattern (e.g., describe that the pattern 2, 4, 8, 16 starts at 2 and doubles or that the pattern 20, 10, 5, 2.5 starts at 20 and halves; identify the missing element in the pattern 3, 6, __, 24, 48; write the next two numbers in the pattern 80, 40, 20, 10).					x							
						Generate a pattern from a given rule, or match a pattern to a given rule using any operation (e.g., start at 5 and increase by 3 to generate 5, 8, 11, 14, 17 . . . ; match the pattern 3, 6, 12, 24, ... to one of these rules A) start at 3 and add 3, B) start at 3 and double, C) start at 3 and add 6, and D) start at 3 and halve).						x						
						Recognize and extend non-linear patterns, including squaring patterns, which may be supported by a visual representation (e.g., recognize that 1, 3, 6, 10 increases by 2, then 3, then 4, when accompanied by dots or points arranged into triangles; extend the pattern 2, 4, 16, 25 ).									x			
		A2	Expressions	A2.1	Evaluate, model and compute with expressions	Use linear expressions to represent problem situations with a single variable (e.g., The cost of buying cinema tickets online is £12 per ticket plus a £2 booking fee. Write this as an expression where $x$ is the number of tickets purchased).										x		
						Add and subtract linear expressions (e.g., $(3x + 4y) - (2x + 5y)$ ).										x		

Domain		Construct		Subconstruct		Global Proficiency Descriptor for 'Meets Global Minimum Proficiency'	Grade										
							1	2	3	4	5	6	7	8	9		
						Use expressions to represent problem situations with multiple variables (e.g., <i>Akeelah bought 4 blouses for x dollars and a wristwatch for y dollars. Represent this as an expression.</i> )										x	
						Multiply and divide linear monomials, and simplify linear expressions by using the distributive property (e.g., <i>multiply (3x)(5y); simplify 2x(3x + 4).</i> )										x	
						Evaluate and simplify exponential expressions using the Laws of Exponents (e.g., <i>evaluate 2x<sup>3</sup> when x = 7; simplify (2x<sup>3</sup>)<sup>2</sup>.</i> )										x	
						Multiply two binomial linear expressions (e.g., <i>multiply (3x - 4y)(2x + 5y).</i> )											x
						Factor linear and exponential expressions using the greatest common factor algebraically (e.g., <i>factor 4x<sup>2</sup> + 8xy - 6x to 2x(2x + 4y - 3).</i> )											x
						Reason proportionally to answer real-world problems involving a unit ratio expressed informally (e.g., <i>If Tulika needs 3 eggs for 1 cake, how many eggs does Tulika need for 5 cakes?</i> ).							x				
						Reason proportionally to answer real-world problems involving a ratio (e.g., <i>Purple paint is made from 2 parts blue paint to 3 parts red paint. I have 10 parts of blue paint. How many parts of red paint do I need?; or the ratio of teachers to students on a school trip must be 1:9. How many teachers are needed if there are 36 students?</i> ).								x			
						Solve problems, including real-world problems, involving finding the percentages of a known quantity (e.g., <i>20% of 70 = ___; A stadium holds 3200 people. If the stadium is 80% full, how many people are in the stadium?</i> ).								x			
						Solve proportions written as two equal ratios (e.g., <i>solve 2/3 = 10/x.</i> )										x	
						Solve problems, including real-world problems, involving percent increase or decrease (e.g., <i>A shirt that normally costs 25 Euros is on sale for 10% off. How much does it cost now?; A shirt cost 25 Euros in November and then 20 Euros in December. What is the percent decrease in cost?</i> ).										x	
						Solve problems, including real-world problems, involving percentages where the percentage and final quantity are known, but the initial quantity is not (e.g., <i>Ana paid 8 dollars for a belt that was on sale. The price</i>											x



Domain	Construct	Subconstruct	Global Proficiency Descriptor for 'Meets Global Minimum Proficiency'	Grade											
				1	2	3	4	5	6	7	8	9			
			had been reduced by 20%. What was the original price of the belt?).												
			Write a proportion as two equal ratios to model a proportional relationship (e.g., write $2/3 = 10/x$ to represent a problem that says, 'Purple paint is made from 2 parts blue paint to 3 parts red paint. If I have 10 parts of blue paint. How many parts of red paint do I need?').											x	
		A3.2 Demonstrate an understanding of equivalency	Create a numerical expression using + or - to model a situation (e.g., represent the following in a number sentence: 3 people are on a bus, and 4 more get on).			x									
			Create a numerical expression using x or ÷ to model a situation (e.g., represent the following in a number sentence - 3 people get on the bus at each of four stops).				x								
			Find a missing value in real-world addition and subtraction problems within 20 (e.g., 3 people are on a bus. More people get on. There are now 7 people on the bus. How many people got on the bus?).			x									
			Find a missing value in a number sentence using addition and subtraction of numbers within 100 (e.g., $23 + \_ = 59$ ).				x								
			Find a missing value in a number sentence using multiplication and division within 100 (e.g., $7 \times \_ = 35$ ).					x							
			Find a missing value in a number sentence using any one of the four operations (e.g., $3 \times \_ = 18$ ).						x						
			Represent real-world addition and subtraction problems within 20 using a number sentence with a symbol or blank to represent the missing value (e.g., 13 people are on a bus. More people get on. There are now 7 people on the bus. How many people got on the bus? Represent this situation with an addition or a subtraction sentence).					x							
			Represent real-world problems involving the multiplication of two whole numbers to 10 and related division facts, using a number sentence with a symbol or blank to represent the missing value (e.g. Paul has three bags of oranges. There are the same number of oranges in each bag. He has 18 oranges altogether. How many oranges are there in each bag? Represent the situation with a multiplication sentence)						x						

Domain		Construct		Subconstruct		Global Proficiency Descriptor for 'Meets Global Minimum Proficiency'	Grade														
							1	2	3	4	5	6	7	8	9						
						Represent real-world problems using a number sentence with one of the four operations (e.g., <i>Abu has 5 identical water bottles that weigh a total of 15 pounds. Represent the problem as <math>5 \times \underline{\quad} = 15</math>.</i> )							x								
				A3.3	Solve equations and inequalities	Represent and solve problems, including real-world problems, using a two-step equation with any of the four operations (e.g., <i>solve <math>3x + 4 = 22</math>; Some people got on a bus, doubling the number of passengers. At the next stop, 8 people got off, leaving 16 people on the bus. Represent the situation as an equation, and solve to find the number of people on the bus originally.</i> )									x						
						Represent and solve problems, including real-world problems, using more than two steps, including those that involve the distributive property, combining like terms, etc. (e.g., <i>solve <math>3x + 4(x + 2) = 22</math>; The older children get two more cookies than the younger children. If there are three younger children and four older children and 22 cookies were distributed, how many cookies did the younger children get?; Represent as <math>3x + 4(x + 2) = 22</math> and solve.</i> )												x			
						Represent and solve problems, including real-world problems, using two linear equations (e.g., <i>If <math>3x + 4y = 24</math> and <math>4x + 3y = 22</math>, solve for <math>x</math> and <math>y</math>; Or, Andre has more money than Bob. If Andre gives Bob \$20, they would have the same amount. If Bob gave Andre \$22, Andre would then have twice as much as Bob. Represent as two linear equations, and work out how much each of them actually has.</i> )															x
						Interpret equations and their solutions in terms of context (e.g., <i>given an algebraic graph, such as a distance-time graph, interpret the slope as speed.</i> )															x
						Graph linear equations, including those of the form $y = k$ and $x = k$ and calculate the slope of a line from a table, equation, graph, or ordered pairs. Identify the $x$ - and $y$ -intercepts of the graphed line of an equation (e.g., <i>graph <math>y = 5x + 2</math>; graph <math>y = 4</math>; graph <math>x = 4</math>; in the equation <math>y = 3x + 2</math>, identify what the slope is; given a coordinate at (2,4) and a coordinate of (3,7), solve for the slope.</i> )															
						Solve multi-step inequalities (e.g., $x + 5(x - 2) > 2$ ).														x	

Domain		Construct		Subconstruct		Global Proficiency Descriptor for 'Meets Global Minimum Proficiency'	Grade											
							1	2	3	4	5	6	7	8	9			
				A3.4	Interpret and evaluate functions	Identify a function presented in a graph, either as a set of points or as a continuous line (curved or straight).												x

**TABLE 5: DESCRIPTORS FOR ALL FOUR PROFICIENCY LEVELS**

GRADE 1. GLOBAL PROFICIENCY DESCRIPTORS		
Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency

**N: NUMBER KNOWLEDGE**

**NI: WHOLE NUMBERS**

**NI.1: Identify and count in whole numbers, and identify relative magnitude**

NI.1.1_P	Count in whole numbers up to 20.	NI.1.1_M	Count in whole numbers up to 30.	NI.1.1_E	Count in whole numbers up to 100.
NI.1.2_P	Read whole numbers up to 20 in numerals.	NI.1.2_M	Read and write whole numbers up to 30 in numerals.	NI.1.2_E	Read and write whole numbers up to 100 in numerals.
NI.1.3_P	Compare and order whole numbers up to 20.	NI.1.3_M	Compare and order whole numbers up to 30.	NI.1.3_E	Compare and order whole numbers up to 100.

**NI.2: Represent whole numbers in equivalent ways**

NI.2.1_P	Identify equivalence between whole quantities up to 5 represented as objects, pictures, and numerals (e.g., when given a picture of five objects and other pictures of various numbers of objects, select the picture that has the same number of objects; or associate a numeral with the appropriate number of objects).	NI.2.1_M	Identify equivalence between whole quantities up to 10 represented as objects, pictures, and numerals (e.g., when given a picture of ten objects and other pictures of various numbers of objects, select the picture that has the same number of objects; or associate a numeral with the appropriate number of objects).	NI.2.1_E	Identify equivalence between whole quantities up to 30 represented as objects, pictures, and numerals (e.g., when given a picture of 30 flowers, identify the picture that has the number of butterflies that would be need for each flower to have a butterfly).
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## GRADE 1. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
<b>NI.3: Solve operations involving whole numbers</b>		
<p><b>NI.3.1_P</b> Add and subtract within 5 (i.e., where the sum or minuend does not surpass 5), and represent these operations with objects, pictures, or symbols (e.g., <math>3 + 2 = \_;</math> <math>5 - 1 = \_;</math> when presented with a picture of 3 whole bananas and 1 banana peel, match to the sentence <math>4 - 1 = 3</math> or complete the statement <math>4 - 1 = \_.</math></p>	<p><b>NI.3.1_M</b> Add and subtract within 10 (i.e., where the sum or minuend does not surpass 10), and represent these operations with objects, pictures, or symbols (e.g., <math>5 + 4 = \_;</math> <math>7 - 5 = \_;</math> when presented with a picture of three baskets, with the first basket showing 3 bananas and a second basket showing 5 bananas, complete the addition statement <math>3 + 5 = \_.</math> or find an appropriate addition statement from a list. Or, when presented with a picture of 6 whole bananas and 3 banana peels, match to sentence <math>9 - 3 = 6</math> or complete statement <math>9 - 3 = \_.</math></p>	<p><b>NI.3.1_E</b> Add and subtract within 20 (i.e., where the sum or minuend does not surpass 20) and represent these operations with objects, pictures, or symbols (e.g., <math>8 + 6 = \_;</math> <math>15 - 4 = \_;</math> when presented with a picture of 12 bananas and 3 more bananas added, complete addition statement <math>12 + 3 = \_.</math> or find a matching addition statement <math>12 + 3 = 15</math> from a list. Or, when presented with a picture of 15 whole bananas and 4 banana peels, match to the sentence <math>19 - 4 = 15</math> or complete the statement <math>19 - 4 = \_.</math></p>
<p><b>NI.3.2_P</b> Find the double of a set up to 2 objects, and divide a group of up to 4 objects into 2 equal sets (e.g., <i>There are two packages of biscuits. There are two packages of biscuits. How many biscuits are there in total?; There are 4 biscuits in a package. The biscuits will be shared equally by two friends. How many biscuits will each friend get?</i>).</p>	<p><b>NI.3.2_M</b> Find the double of a set of up to 5 objects, and divide a group of up to 10 objects into two equal sets (e.g., <i>There are four biscuits in a package. There are two packages of biscuits. How many biscuits are there in total?; There are 8 biscuits in a package. The biscuits will be shared equally by two friends. How many biscuits will each friend get?</i>).</p>	<p><b>NI.3.2_E</b> Find the double of a set of up to 10 objects, and divide a group of up to 20 objects into 2 equal sets (e.g., <i>An octopus has 8 legs. There are two octopuses. How many octopus legs are there in total?; There are 16 biscuits. The biscuits will be shared equally by two friends. How many biscuits will each friend get?</i>).</p>

## GRADE 1. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
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### NI.4: Solve real-world problems involving operations on whole numbers

<p><b>NI.4.1_P</b> Solve simple real-world problems using addition and subtraction facts within 5 (i.e., where the sum or minuend does not surpass 5) (e.g., <i>There are two eggs in a carton. One more egg is put in the carton. How many eggs are in the carton now?; One egg in a carton of four eggs is not cracked. How many eggs are not cracked?</i>).</p>	<p><b>NI.4.1_M</b> Solve simple real-world problems using addition and subtraction facts within 10 (i.e., where the sum or minuend does not surpass 10) (e.g., <i>There are 7 eggs in a carton. 3 more eggs are put in the carton. How many eggs are in the carton now?; Three eggs in a carton of 10 eggs are cracked. How many eggs are not cracked?</i>).</p>	<p><b>NI.4.1_E</b> Solve simple real-world problems using addition and subtraction facts within 20 (i.e., where the sum or minuend does not surpass 20) (e.g., <i>There are 14 eggs in a carton. 5 more eggs are added. How many eggs are in the carton now?; Six eggs in a carton of 12 eggs are cracked. How many eggs are not cracked?</i>).</p>
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## M: MEASUREMENT

### MI: LENGTH, WEIGHT, CAPACITY, VOLUME, AREA, AND PERIMETER

#### MI.1: Use non-standard and standard units to measure, compare, and order

<p><b>MI.1.1_P</b> Visually compare relative lengths (e.g., <i>longer/shorter; closer/further</i>) of everyday objects.</p>	<p><b>MI.1.1_M</b> Measure the length of objects using non-standard units (e.g., <i>identify that the pencil is 5 paperclips long</i>).</p>	<p><b>MI.1.1_E</b> Use non-standard units to estimate and compare the length of objects (e.g., <i>identify that the red pencil is 4 paperclips long and the black pencil is 6 paperclips long</i>).</p>
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### M2: TIME

#### M2.1: Tell time

<p><b>M2.1.1_P</b> Distinguish between parts of the day by everyday activities (e.g., <i>eat breakfast in the morning and go to sleep at night</i>).</p>	<p><b>M2.1.1_M</b> Identify, sequence, and describe activities/events that take place at different parts of the day (e.g., <i>morning and afternoon</i>).</p>	<p><b>M2.1.1_E</b> Tell time using an analog clock to the nearest hour.</p>
<p><b>M2.1.2_P</b> N/A</p>	<p><b>M2.1.2_M</b> N/A</p>	<p><b>M2.1.2_E</b> Recognize that there are 7 days in a week and 12 months in a year.</p>

### M3: CURRENCY

#### M3.1: Use different currency units to create amounts

## GRADE 1. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
M3.1.1_P Know the value of a coin or paper money (banknotes) <i>(e.g., identify that a dime is worth ten cents).</i>	M3.1.1_M Count simple combinations of two commonly used currency denominations in a country.	M3.1.1_E Count combinations of currency denominations commonly used in the country.

### G: GEOMETRY

#### GI: PROPERTIES OF SHAPES AND FIGURES

##### GI.1: Recognize and describe shapes and figures

G1.1.1_P Recognize basic shapes <i>(i.e., circles, squares, triangles)</i> in the environment <i>(e.g., point to a wheel in a picture when asked to identify the circle in the picture).</i>	G1.1.1_M Recognize and name basic shapes <i>(e.g., recognize a picture of a square, circle, rectangle, or triangle or name a shape when it is pointed to).</i>	G1.1.1_E Recognize and name shapes that are regular and irregular <i>(e.g., if shown an irregular triangle, recognize that it is a triangle; name a hexagon).</i>
G1.1.2_P N/A	G1.1.2_M N/A	G1.1.2_E Recognize and name straight and curved lines and attributes of shapes <i>(e.g., number of sides, number of corners).</i>
G1.1.3_P N/A	G1.1.3_M N/A	G1.1.3_E Recognize when a two-dimensional shape has been rotated or reflected <i>(e.g., when shown a number of shapes, identify those that are the same, even when some are rotated or reflected).</i>

#### GI: SPATIAL VISUALIZATIONS

##### GI.1: Compose and decompose shapes and figures

G1.1.1_P Compose a larger two-dimensional shape from two given shapes when the outlines for the shapes are provided.	G1.1.1_M Compose a larger two-dimensional shape from a small number of given shapes when the outlines for the shapes are provided <i>(e.g., use the smaller shapes to make the larger shape).</i>	G1.1.1_E Compose/decompose a larger two-dimensional shape from a small number of given shapes without lines showing where the shapes go <i>(e.g., use the smaller shapes to make the larger shape).</i>
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## GRADE 1. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global  
Minimum Proficiency

Meets Global Minimum Proficiency

Exceeds Global Minimum Proficiency

### G3: POSITION AND DIRECTION

G3.1: Describe the position and direction of objects in space

**G3.1.1\_P** Recognize familiar positional terms (e.g., *answer the question, 'Which object is next to the book?' by saying, 'The book is next to the pencil.'*).

**G3.1.1\_M** Use familiar positional terms (e.g., *answer the question, 'Where is the book?' by saying, 'The book is next to the pencil.'*).

**G3.1.1\_E** Recognize and use positional terms that describe the location of an object with more precision (e.g., *answer the question, 'Where is the book?' by saying, 'The book is between the pencil and the bag.'*).

### S: STATISTICS AND PROBABILITY

#### SI: DATA MANAGEMENT

SI.1: Retrieve and interpret data presented in displays

**SI.1.1\_P** Retrieve information about a single category from a tally chart, bar graph, or pictograph with up to two categories and a single-unit scale (e.g., *How many children liked red on this bar graph?*).

**SI.1.1\_M** Retrieve information about a single category from a tally chart, bar graph, or pictograph with up to four categories and a single-unit scale (e.g., *How many children liked red on this bar graph?*).

**SI.1.1\_E** Compare between categories of a tally chart, bar graph, or pictograph with up to four categories and a single-unit scale, using terms such as more than, less than, etc. (e.g., *Which color was chosen less often than green on this bar graph?*).

### A: ALGEBRA

#### A1: PATTERNS

A1.1: Recognize, describe, extend, and generate patterns

**A1.1.1\_P** Recognize repeating patterns of items such as colors, shapes, and sounds (e.g., *when provided with several options, ○□○□○□, ○□○□○□, □□○□○□, identify which one is a pattern*).

**A1.1.1\_M** Copy repeating patterns of items such as colors, shapes, and sounds (e.g., *when provided ○□○□○□, select another pattern that is similar to that one, e.g., red, blue, red, blue, red, blue. Or, when someone claps a simple repeated rhythm, 'clap; clap clap; clap; clap clap; clap; clap clap', continue the rhythm*).

**A1.1.1\_E** Recognize repeating sets in a pattern and use this to identify a missing element and extend the pattern (e.g., *identify that ○□□ is the repeating set in ○□□○□□○□□; identify the missing element in the following set ○□□○□□\_□□; when presented with ○□□○□□○□□, add two additional sets to the pattern*).

#### A2: EXPRESSIONS



## GRADE 1. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global  
Minimum Proficiency

Meets Global Minimum Proficiency

Exceeds Global Minimum Proficiency

Not applicable to grade 1

### A3: RELATIONS AND FUNCTIONS

A3.1: Variation (ratio, proportion, and percentage) - not applicable to grade 1

A3.2: Demonstrate an understanding of equivalency - not applicable to grade 1

## GRADE 2. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
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### N: NUMBER KNOWLEDGE

#### NI: WHOLE NUMBERS

##### NI.1: Identify and count in whole numbers, and identify relative magnitude

NI.1.1_P	Count in whole numbers up to 30.	NI.1.1_P	Count in whole numbers up to 100.	NI.1.1_E	Count backwards from 20.
NI.1.2_P	Read and write whole numbers up to 30 in words and in numerals.	NI.1.2_P	Read and write whole numbers up to 100 in words and in numerals.	NI.1.2_E	N/A
NI.1.3_P	Compare and order whole numbers up to 30.	NI.1.3_P	Compare and order whole numbers up to 100.	NI.1.3_E	N/A
NI.1.4_P	N/A	NI.1.4_P	Skip count forwards by twos or tens.	NI.1.4_E	Skip count backwards by tens.

##### NI.2: Represent whole numbers in equivalent ways

NI.2.1_P	Identify and represent the equivalence between whole quantities up to 10 represented as objects, pictures, and numerals (e.g., when given a picture of ten objects and other pictures of various numbers of objects, select the picture that has the same number of objects; or associate a numeral with the appropriate number of objects).	NI.2.1_M	Identify and represent the equivalence between whole quantities up to 30 represented as objects, pictures, and numerals (e.g., when given a picture of 30 flowers, identify the picture that has the number of butterflies that would be needed for each flower to have a butterfly; or given a picture of 19 shapes, draw 19 more shapes).	NI.2.1_E	Use place-value concepts for tens and ones (e.g., compose or decompose a two-digit whole number using a number sentence such as $35 = 3 \text{ tens and } 5 \text{ ones}$ , $35 = 30 + 5$ or using number bonds, determine the value of a digit in the tens and ones place).
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## GRADE 2. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
<b>NI.3: Solve operations using whole numbers</b>		
<p><b>NI.3.1_P</b> Add and subtract within 10 (i.e., where the sum or minuend does not surpass 10), and represent these operations with objects, pictures, or symbols (e.g., <i>when presented with two pictures of marbles, with the first showing 3 marbles and the second showing 5 marbles, complete or match to the addition statement <math>3 + 5 = \underline{\quad}</math>. Or, when presented with a picture of a carton that can hold 10 bottles, 3 of which have been removed, complete or match to the subtraction statement <math>10 - 3 = \underline{\quad}</math>.</i></p>	<p><b>NI.3.1_M</b> Add and subtract within 20 (i.e., where the sum or minuend does not surpass 20), and represent these operations with objects, pictures, or symbols (e.g., <i><math>16 - 3 = \underline{\quad}</math>; <math>12 + 3 = \underline{\quad}</math>; when presented with a picture of 12 marbles with 3 more marbles added, complete or match to the number sentence <math>12 + 3 = \underline{\quad}</math>. Or, when presented with a picture of a carton that can hold 20 bottles, 7 of which have been removed, complete or match to the subtraction statement <math>20 - 7 = \underline{\quad}</math>.</i></p>	<p><b>NI.3.1_E</b> Add and subtract within 30 (i.e., where the sum or minuend does not surpass 30), and represent these operations with objects, pictures, or symbols (e.g., <i>when presented with a picture of 22 marbles with 3 more marbles added, complete or match to the number sentence <math>22 + 3 = \underline{\quad}</math>. Or, when presented with a picture of a carton that can hold 30 bottles, 13 of which have been removed, complete or match to the subtraction statement <math>30 - 13 = \underline{\quad}</math>.</i></p>
<p><b>NI.3.2_P</b> Find the double of a set of up to 5 objects, and divide a group of up to 10 objects into two equal sets (e.g., <i>There are four biscuits in a package. There are two packages of biscuits. How many biscuits are there in total?; There are 8 biscuits in a package. The biscuits will be shared equally by two friends. How many biscuits will each friend get?</i>).</p>	<p><b>NI.3.2_M</b> Find the double of a set of up to 10 objects, and divide a group of up to 20 objects into 2 equal sets (e.g., <i>An octopus has 8 legs. There are two octopuses. How many octopus legs are there in total?; There are 16 biscuits. The biscuits will be shared equally by two friends. How many biscuits will each friend get?</i>).</p>	<p><b>NI.3.2_E</b> Find the triple of a set of up to 10 objects, and divide a group of up to 30 objects into 3 equal sets (e.g., <i>An octopus has 8 legs. There are three octopuses. How many octopus legs are there in total?; There are 24 biscuits. The biscuits will be shared equally by three friends. How many biscuits will each friend get?</i>).</p>
<p><b>NI.3.3_P</b> Perform calculations involving two or more additions and subtractions, within the limits for partially meets expectations described above, when order of operations is</p>	<p><b>NI.3.3_M</b> Perform calculations involving two or more additions and subtractions, within the limits for meets expectations described above, when order of operations is not a factor (e.g., <i><math>14 - 5 + 4 = \underline{\quad}</math>; <math>17 - 3 - 7 = \underline{\quad}</math>.</i></p>	<p><b>NI.3.3_E</b> Perform calculations involving two or more additions and subtractions, within the limits for exceeds expectations described above, when order of operations is not a factor (e.g., <i><math>19 + 5 - 14 = \underline{\quad}</math>; <math>13 + 9 + 5 = \underline{\quad}</math>.</i></p>

## GRADE 2. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
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not a factor (e.g.,  $4 - 1 + 2 = \underline{\quad}$ ;  $1 + 2 + 1 = \underline{\quad}$ ).

### NI.4: Solve real-world problems involving whole numbers

NI.4.1_P	Solve simple real-world problems using addition and subtraction facts within 10 (i.e., where the sum or minuend does not surpass 10) (e.g., <i>There are 8 sheep in a field. 2 more sheep come into the field. How many sheep are in the field now?; There are 7 sheep in a field. 3 go to the stable. How many sheep are left in the field?</i> ).	NI.4.1_M	Solve simple real-world problems using addition and subtraction facts within 20 (i.e., where the sum or minuend does not surpass 20) (e.g., <i>There are 15 sheep in a field. 4 more sheep come into the field. How many sheep are in the field now?; There are 16 sheep in a field. 4 go to the stable. How many sheep are left in the field?</i> ).	NI.4.1_E	Solve simple real-world problems involving addition and subtraction of whole numbers within 30 (i.e., where the sum or minuend does not surpass 30) (e.g., <i>There are 15 sheep in a field. 12 more sheep come into the field. How many sheep are in the field now?; There are 24 sheep in a field. 12 go to the stable. How many sheep are left in the field?</i> ).
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## M: MEASUREMENT

### M1: LENGTH, WEIGHT, CAPACITY, VOLUME, AREA, AND PERIMETER

#### M1.1: Use non-standard and standard units to measure, compare, and order

M1.1.1_P	Measure the length of objects using non-standard units (e.g., <i>identify that the pencil is 5 paperclips long</i> ).	M1.1.1_M	Use non-standard units to estimate and compare the length of objects (e.g., <i>identify that the red pencil is 4 paperclips long and the black pencil is 6 paperclips long</i> ).	M1.1.1_E	Use standard units to compare length and weight (e.g., <i>identify that the pencil is one centimeter longer than the crayon</i> ).
M1.1.2_P	N/A	M1.1.2_M	N/A	M1.1.2_E	Use non-standard units to estimate or measure volume/capacity (e.g., <i>identify which container would hold the most sand or which box would hold most balls given pictures of these items</i> ).

### M2: TIME

#### M2.1: Tell time

M2.1.1_P	Identify, sequence, and describe activities/events that	M2.1.1_M	Tell time using an analog clock to the nearest hour.	M2.1.1_E	Tell time using an analog clock to the nearest half hour.
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## GRADE 2. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
M2.1.2_P	take place at different parts of the day (e.g., morning and afternoon).	M2.1.2_M	Recognize the number of days in a week and months in a year.	M2.1.2_E	Recognize the number of hours in a day, minutes in an hour, and seconds in a minute.
<b>M2.2: Solve problems involving time</b>					
M2.2.1_P	N/A	M2.2.1_M	Solve problems, including real-world problems, using a calendar (e.g., given a calendar, answer the question: March 2 falls on what day of the week?).	M2.2.1_E	N/A
<b>M3: CURRENCY</b>					
<b>M3.1: Use different currency units to create amounts</b>					
M3.1.1_P	Count simple combinations of two commonly used currency denominations in a country.	M3.1.1_M	Count combinations of commonly used currency denominations.	M3.1.1_E	N/A
M3.1.2_P	N/A	M3.1.2_M	Combine commonly used currency denominations to make a specified amount.	M3.1.2_E	Combine commonly used currency denominations to make a specified amount in a variety of ways.
<b>G: GEOMETRY</b>					
<b>G1: PROPERTIES OF SHAPES AND FIGURES</b>					
<b>G1.1: Recognize and describe shapes and figures</b>					
G1.1.1_P	Recognize and name basic shapes (e.g., identify circles, squares, and triangles when asked, 'What shape is this?').	G1.1.1_M	Recognize and name shapes that are regular and irregular (e.g., if shown an irregular triangle, recognize that it is a triangle; name a hexagon).	G1.1.1_E	Recognize and name two-dimensional shapes and familiar three-dimensional figures in everyday life.
G1.1.2_P	N/A	G1.1.2_M	Recognize and name straight and curved lines and attributes of shapes (e.g., number of sides, number of corners).	G1.1.2_E	N/A

## GRADE 2. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
G1.1.3_P N/A	G1.1.3_M Recognize when a two-dimensional shape has been rotated or reflected (e.g., when shown a number of shapes, identify those that are the same, even when some are rotated or reflected).	G1.1.3_E Identify a line of symmetry in two-dimensional shapes.
<b>G2: SPATIAL VISUALIZATIONS</b>		
<b>G2.1: Compose and decompose shapes and figures</b>		
G2.1.1_P  Compose a larger two-dimensional shape from a small number of given shapes when the outlines for the shapes are provided (e.g., use the smaller shapes to make the larger shape).	G2.1.1_M  Compose/decompose a larger two-dimensional shape from a small number of given shapes without lines showing where the shapes go (e.g., use the smaller shapes to make the larger shape).	G2.1.1_E  Use a small number of given shapes to compose multiple larger two-dimensional shapes (e.g., identify which of these larger shapes can be made from the smaller shapes?) and decompose a larger shape into a given number of smaller shapes (e.g., draw one line on the triangle below to show how it can be cut into exactly two smaller triangles).
<b>G3: POSITION AND DIRECTION</b>		
<b>G3.1: Describe the position and direction of objects in space</b>		
G3.1.1_P Use familiar positional terms (e.g., answer the question, 'Where is the book?' by saying, 'The book is next to the pencil.').	G3.1.1_M Recognize and use positional terms that describe the location of an object with more precision (e.g., answer the question, 'Where is the book?' by saying, 'The book is between the pencil and the bag.').	G3.1.1_E Recognize that a map represents a physical space, and use simple maps to recognize the position of objects (e.g., using a map of the classroom, identify which object is between the desk and the door).

## GRADE 2. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global  
Minimum Proficiency

Meets Global Minimum Proficiency

Exceeds Global Minimum Proficiency

### S: STATISTICS AND PROBABILITY

#### SI: DATA MANAGEMENT

##### SI.1: Retrieve and interpret data presented in displays

SI.1.1\_P

Retrieve information about a single category from a tally chart, bar graph, or pictograph with up to four categories and a single-unit scale (e.g., *How many children liked red on this bar graph?*).

SI.1.1\_M

Compare between categories of a tally chart, bar graph, or pictograph with up to four categories and a single-unit scale, using terms such as more than, less than, etc. (e.g., *Which color was chosen less often than green on this bar graph?*).

SI.1.1\_E

Solve a problem involving the sum of or difference between two specified categories of a tally chart, bar graph, or pictograph with a single-unit scale (e.g., *How many children like red and blue in this bar graph?*).

### A: ALGEBRA

#### AI: PATTERNS

##### AI.1: Recognize, describe, extend, and generate patterns

AI.1.1\_P

Copy repeating patterns of items such as colors, shapes, and sounds (e.g., *when provided ○□○□○□, select another pattern that is similar to that one, e.g., red, blue, red, blue, red, blue. Or, when someone claps a simple repeated rhythm, 'clap; clap clap; clap; clap clap; clap; clap clap', can continue the rhythm*).

AI.1.1\_M

Recognize repeating sets in a pattern and use this to identify a missing element and extend the pattern (e.g., *identify that ○□□ is the repeating set in ○□□○□□○□□; identify the missing element in the following set ○□□○□□\_□□; when presented with ○□□○□□○□□, add two additional sets to the pattern*).

AI.1.1\_E

Describe repeating patterns (e.g., *explain that ○□□ repeats three times in the following set ○□□○□□○□□; explain that 1, 2, 3, 4 repeats three times in the following set 1, 2, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4*).

## GRADE 2. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
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A2: EXPRESSIONS  
Not applicable to grade 2

A3: RELATIONS AND FUNCTIONS  
A3.1: Variation (ratio, proportion, and percentage) - not applicable to grade 2

A3.2: Demonstrate an understanding of equivalency

A3.2.1_P	N/A	A3.2.1_M	N/A	A3.2.1_E	Create a numerical expression using + or - to model a situation (e.g., represent the following in a number sentence: 3 people are on a bus, and 4 more get on: $3 + 4$ ).
A3.2.2_P	N/A	A3.2.2_M	N/A	A3.2.2_E	Find a missing value in real-world addition and subtraction problems within 20 (e.g., 3 people are on a bus. More people get on. Now there are 7. How many people got on the bus?).



## GRADE 3. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
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### N: NUMBER KNOWLEDGE

#### NI: WHOLE NUMBERS

##### NI.1: Identify and count in whole numbers, and identify relative magnitude

NI.1.1_P	Count in whole numbers up to 100.	NI.1.1_M	Count in whole numbers up to 1000.	NI.1.1_E	Count in whole numbers up to 10,000.
NI.1.2_P	Read and write whole numbers up to 100 in words and in numerals.	NI.1.2_M	Read and write whole numbers up to 1000 in words and in numerals.	NI.1.2_E	Read and write whole numbers up to 10,000 in words and in numerals.
NI.1.3_P	Compare and order whole numbers up to 100.	NI.1.3_M	Compare and order whole numbers up to 1000.	NI.1.3_E	Compare and order whole numbers up to 10,000.
NI.1.4_P	Skip count forwards by twos or tens.	NI.1.4_M	Skip count backwards by tens.	NI.1.4_E	Skip count forwards and backwards by hundreds.

##### NI.2: Represent whole numbers in equivalent ways

NI.2.1_P	Identify and represent the equivalence between whole quantities up to 30 represented as objects, pictures, and numerals <i>(e.g., when given a picture of 30 flowers, identify the picture that has the number of butterflies that would be needed for each flower to have a butterfly; or given a picture of 19 shapes, draw 19 more shapes).</i>	NI.2.1_M	Use place-value concepts for tens and ones <i>(e.g., compose or decompose a two-digit whole number using a number sentence such as <math>35 = 3</math> tens and 5 ones, <math>35 = 30 + 5</math> or using number bonds; determine the value of a digit in the tens and ones place).</i>	NI.2.1_E	Use place-value concepts for hundreds, tens, and ones <i>(e.g., compose or decompose a three-digit whole number using a number sentence such as <math>254 = 2</math> hundreds, 5 tens and 4 ones; <math>254 = 200 + 50 + 4</math>; determine the value of a digit in the hundreds place, etc.).</i>
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## GRADE 3. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
<b>NI.3: Solve operations using whole numbers</b>		
<p><b>NI.3.1_P</b> Add and subtract within 100 (i.e., where the sum or minuend does not surpass 100), without regrouping, and represent these operations with objects, pictures or symbols (e.g., <math>65 + 23</math>; solve an addition or subtraction problem presented by images of bundles of 10s and ones; use skips on a hundreds grids or a numberline or multibase arithmetic blocks to solve additions and subtraction problems).</p>	<p><b>NI.3.1_M</b> Demonstrate fluency with addition and subtraction within 20; and add and subtract within 100 (i.e., where the sum or minuend does not surpass 100), with and without regrouping, and represent these operations with objects, pictures, or symbols (e.g., <math>32 + 59</math>; solve an addition or subtraction problem presented by images of bundles of 10s and ones; use numberlines or skips on hundreds grid to reason through or solve addition and subtraction problems).</p>	<p><b>NI.3.1_E</b> Add and subtract within 1,000 (i.e., where the sum or minuend does not surpass 1,000), with and without regrouping, and represent these operations with objects, pictures, or symbols (e.g., <math>550 + 250</math>; <math>457 - 129</math>; use hundreds grids, number lines, or multibase arithmetic blocks to reason through or solve addition and subtraction problems).</p>
<p><b>NI.3.2_P</b> Multiply and divide within 25 (i.e., up to <math>5 \times 5</math> and <math>25 \div 5</math>, no remainder), and represent these operations with objects, pictures, or symbols (e.g., <math>15 \div 3</math>; <math>3 \times 4</math>; solve multiplication problems by using a rectangular array or by repeating groups of the same number of objects; solve division problems by dividing a group of objects into a given number of equal groupings).</p>	<p><b>NI.3.2_M</b> Multiply and divide within 100 (i.e., up to <math>10 \times 10</math> and <math>100 \div 10</math>, without a remainder), and represent these operations with objects, pictures, or symbols (e.g., <math>72 \div 8</math>; <math>6 \times 9</math>; solve multiplication problems by using a rectangular array or by repeating groups of the same number of objects; solve division problems by dividing a group of objects into a given number of equal groupings).</p>	<p><b>NI.3.2_E</b> Multiply and divide within 144 (i.e., up to <math>12 \times 12</math> and <math>144 \div 12</math>, without a remainder), and represent these operations with objects, pictures or symbols (e.g., <math>120 \div 10</math>; <math>6 \times 12</math>; solve multiplication problems by using a rectangular array cor by repeating groups of the same number of objects; solve division problems by dividing a group of objects into a given number of equal groupings).</p>
<p><b>NI.3.3_P</b> Perform calculations involving two or more operations, within the limits for partially meets expectations described above, when order of operations is not a factor (e.g., <math>5 \times 3 + 62 = \underline{\quad}</math>; <math>4 \times 4 \div 2 = \underline{\quad}</math>).</p>	<p><b>NI.3.3_M</b> Perform calculations involving two or more operations, within the limits for meets expectations described above, when order of operations is not a factor (e.g., <math>6 \times 7 + 19 = \underline{\quad}</math>; <math>6 \times 4 \div 8 = \underline{\quad}</math>).</p>	<p><b>NI.3.3_E</b> Perform calculations involving two or more operations, within the limits for exceeds expectations described above, when order of operations is not a factor (e.g., <math>452 + 369 + 78 = \underline{\quad}</math>; <math>64 \div 8 \div 2 = \underline{\quad}</math>).</p>
<b>NI.4: Solve real-world problems involving whole numbers</b>		

## GRADE 3. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
<p><b>N1.4.1_P</b> Solve simple real-world problems involving addition and subtraction of whole numbers within 30 (i.e., where the sum or minuend does not surpass 30), including problems involving measurement and currency units, without regrouping (e.g., <i>There are 15 sheep in a field. 12 more sheep come into the field. How many sheep are in the field now?; There are 24 sheep in a field. 12 go to the stable. How many sheep are left in the field?</i>).</p>	<p><b>N1.4.1_M</b> Solve simple real-world problems involving addition and subtraction of whole numbers within 100 (i.e., where the sum or minuend does not surpass 100) without regrouping, including problems involving measurement and currency units (e.g., <i>There are 33 sheep in a field. 25 more sheep come into the field. How many sheep are in the field now?; There are 54 children in total in grade 3. Thirteen are absent today. How many grade 3 children are at school today?</i>).</p>	<p><b>N1.4.1_E</b> Solve simple real-world problems involving addition and subtraction of whole numbers within 100 (i.e., where the sum or minuend does not surpass 100) with and without regrouping, including problems involving measurement and currency units (e.g., <i>There are 33 sheep in a field. 28 more sheep come into the field. How many sheep are in the field now?; There are 81 children in total in grade 3. Thirteen are absent today. How many grade 3 children are at school today?</i>).</p>

### N2: FRACTIONS

**N2.1: Identify and represent fractions using objects, pictures, and symbols, and identify relative magnitude**

<p><b>N2.1.1_P</b> Identify everyday unit fractions (e.g., <math>1/2</math>; <math>1/3</math>; <math>1/4</math>) represented as objects or pictures (as part of a whole or part of a set) in fractional notation (e.g., <i>Shade half of this shape; indicate <math>1/4</math> of these objects</i>).</p>	<p><b>N2.1.1_M</b> Identify unit fractions with denominators up to 12 (e.g., <math>1/5</math>; <math>1/7</math>; <math>1/8</math>; <math>1/10</math>) represented as objects or pictures (as part of a whole or part of a set) in fractional notation (e.g., <i>Shade <math>1/5</math> of this shape; indicate <math>1/6</math> of these objects when arranged in a 3 by 6 array</i>).</p>	<p><b>N2.1.1_E</b> Identify non-unit fractions with denominators up to 12 (e.g., <math>2/5</math>; <math>4/7</math>; <math>3/8</math>; <math>5/10</math>) represented as objects or pictures (as part of a whole or part of a set) in fractional notation (e.g., <i>Shade <math>2/3</math> of this shape</i>).</p>
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### M: MEASUREMENT

**MI: LENGTH, WEIGHT, CAPACITY, VOLUME, AREA, AND PERIMETER**

**MI.1: Use non-standard and standard units to measure, compare, and order**

<p><b>MI.1.1_P</b> Use non-standard units to measure or estimate and compare the length of two objects (e.g., <i>identify that the red pencil is 4 paperclips long, and the black pencil is 6 paperclips long</i>).</p>	<p><b>MI.1.1_M</b> Use standard units to compare length and weight when provided the unit of measurement (e.g., <i>identify that the pencil is one centimeter longer than the crayon</i>).</p>	<p><b>MI.1.1_E</b> Select and use appropriate standard units to estimate, measure, and compare length and weight (e.g., <i>choose centimeters instead of meters to measure a pencil; estimate the weight of the apple when given the following choices: A. 5g B. 200g C. 1kg D. 5kg</i>).</p>
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## GRADE 3. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
M1.1.2_P	N/A	M1.1.2_M	Use non-standard units to estimate or measure volume/capacity (e.g., identify which container would hold the most sand or which box would hold most balls given pictures of these items).	M1.1.2_E	Select and use appropriate standard units to measure and compare capacity/volume (e.g., the measuring cups contain 200 ml of water and 100 ml of oil).
<b>M2: TIME</b>					
<b>M2.1: Tell time</b>					
M2.1.1_P	Tell time using an analog clock to the nearest hour.	M2.1.1_M	Tell time using an analog clock to the nearest half hour.	M2.1.1_E	Tell time using an analog clock to the nearest minute.
M2.1.2_P	Recognize the number of days in a week and months in a year.	M2.1.2_M	Recognize the number of hours in a day, minutes in an hour, and seconds in a minute.	M2.1.2_E	N/A
<b>M2.2: Solve problems involving time</b>					
M2.2.1_P	Solve problems, including real-world problems, using a calendar (e.g., given a calendar, answer the question: March 2 falls on what day of the week?).	M2.2.1_M	Solve problems, including real-world problems, involving elapsed time in hours and half-hours (e.g., calculate the difference between 2:00 and 5:30 or the difference between 16:00 and 16:30).	M2.2.1_E	Solve problems, including real-world problems, involving elapsed time in minutes within an hour (e.g., calculate the difference between 3:42 and 3:56 or the difference between 16:35 and 16:52).
<b>M3: CURRENCY</b>					
<b>M3.1: Use different currency units to create amounts</b>					
M3.1.1_P	Count combinations of commonly used currency denominations.	M3.1.1_M	N/A	M3.1.1_E	N/A
M3.1.2_P	Combine commonly used currency denominations to make a specified amount.	M3.1.2_M	Combine commonly used currency denominations to make a specified amount in a variety of ways.	M3.1.2_E	Solve problems, including real-world problems, involving combining commonly used currency denominations.
<b>G: GEOMETRY</b>					
<b>G1: PROPERTIES OF SHAPES AND FIGURES</b>					
<b>G1.1: Recognize and describe shapes and figures</b>					
G1.1.1_P	Recognize and name shapes that are regular and irregular (e.g., if shown an irregular triangle,	G1.1.1_M	Recognize and name two-dimensional shapes and familiar three-dimensional figures in everyday life.	G1.1.1_E	Recognize and name two-dimensional shapes by a written or spoken description of their simple attributes (e.g., name a shape given a description of its

## GRADE 3. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
	<i>recognize that it is a triangle; name a hexagon).</i>				<i>number of sides, number of corners, relative lengths of sides, etc.).</i>
G1.1.2_P	Recognize and name straight and curved lines and attributes of shapes (e.g., <i>number of sides, number of corners</i> ).	G1.1.2_M	N/A	G1.1.2_E	N/A
G1.1.3_P	Recognize when a two-dimensional shape has been rotated or reflected (e.g., <i>when shown a number of shapes, identify those that are the same, even when some are rotated or reflected</i> ).	G1.1.3_M	Identify a line of symmetry in two-dimensional shapes.	G1.1.3_E	Recognize and describe the congruence and similarity of two-dimensional shapes (e.g., <i>when shown two shapes, explain how they are similar using mathematical or non-mathematical language - 'It got bigger and has been turned' or 'It's been enlarged and rotated'</i> ).

### G2: SPATIAL VISUALIZATIONS

#### G2.1: Compose and decompose shapes and figures

G2.1.1\_P

Compose/decompose a larger two-dimensional shape from a small number of given shapes (e.g., *use the smaller shapes to make the larger shape*).

G2.1.1\_M

Use a small number of given shapes to compose multiple larger two-dimensional shapes (e.g., *identify which of these larger shapes can be made from the smaller shapes?*) and decompose a larger shape into a given number of smaller shapes (e.g., *draw one line on the triangle below to show how it can be cut into exactly two smaller triangles*).

G2.1.1\_E

N/A

### G3: POSITION AND DIRECTION

#### G3.1: Describe the position and direction of objects in space

## GRADE 3. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
<p>G3.1.1_P Recognize that a map represents a physical space, and use simple maps to recognize the position of objects (e.g., using a map of the classroom, identify which object is between the desk and the door).</p>	<p>G3.1.1_M Accurately use the terms left and right, and use simple maps to describe locations using positional terms (e.g., answer, 'Where is the teacher's desk?' To the (left) of the chalkboard).</p>	<p>G3.1.1_E Using a simple map, follow directions and/or give directions to a given location (e.g., using this map, if you are at the school, and you walk towards the tree and turn left, and walk forward again, where would you be?; Using this map, how do you get from the school to the green house?).</p>

### S: STATISTICS AND PROBABILITY

#### SI: DATA MANAGEMENT

##### SI.1: Retrieve and interpret data presented in displays

<p>SI.1.1_P Compare between categories of a tally chart, bar graph, or pictograph with up to four categories and a single-unit scale, using terms such as more than, less than, etc. (e.g., Which color was chosen less often than green on this bar graph?).</p>	<p>SI.1.1_M Solve a problem involving the sum of or difference between two specified categories of a tally chart, bar graph, or pictograph with a single-unit scale (e.g., How many children like red and blue in this bar graph?).</p>	<p>SI.1.1_E Solve a problem involving more than two pieces of information from a tally chart, bar graph, or pictograph with a single-unit scale (e.g., How many children were asked about their favorite color in this bar graph?).</p>
<p>SI.1.2_P N/A</p>	<p>SI.1.2_M N/A</p>	<p>SI.1.2_E Complete missing information in a tally chart, bar graph, or pictograph that arranges data into categories and uses a single-unit scale (e.g., add a row or column to a partially completed pictograph).</p>
<p>SI.1.3_P N/A</p>	<p>SI.1.3_M N/A</p>	<p>SI.1.3_E Retrieve information from a tally chart, bar graph, or pictograph with a multi-unit scale.</p>

### A: ALGEBRA

#### AI: PATTERNS

##### AI.1: Recognize, describe, extend, and generate patterns

## GRADE 3. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
<p><b>A1.1.1_P</b> Recognize repeating sets in a pattern and use this to identify a missing element and extend the pattern (e.g., identify that <math>\square\square</math> is the repeating set in <math>\square\square\square\square\square\square</math>; identify the missing element in the following set <math>\square\square\square\square\square\square</math>; when presented with <math>\square\square\square\square\square\square</math>, add two additional sets to the pattern).</p>	<p><b>A1.1.1_M</b> Describe repeating patterns (e.g., explain that <math>\square\square</math> repeats three times in the following set <math>\square\square\square\square\square\square</math>; explain that 1, 2, 3, 4 repeats three times in the following set 1, 2, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4).</p>	<p><b>A1.1.1_E</b> Describe numerical patterns that increase or decrease by a constant value with a simple rule, and use this information to identify a missing element or extend the pattern (e.g., describe the pattern 6, 9, 12, 15 as going up by 3s; identify the missing element in the pattern 3, 7, 11, __, 19; extend the pattern 6, 11, 16, 21, ).</p>

### A2: EXPRESSIONS

Not applicable to grade 3

### A3: RELATIONS AND FUNCTIONS

A3.1: Variation (ratio, proportion, and percentage) - not applicable to grade 3

#### A3.2: Demonstrate an understanding of equivalency

<b>A3.2.1_P</b>	N/A	<b>A3.2.1_M</b>	Create a numerical expression using + or - to model a situation (e.g., represent the following in a number sentence: 3 people are on a bus, and 4 more get on).	<b>A3.2.1_E</b>	Create a numerical expression using $\times$ or $\div$ to model a situation (e.g., represent the following in a number sentence - 3 people get on the bus at each of four stops).
<b>A3.2.2_P</b>	N/A	<b>A3.2.2_M</b>	Find a missing value in real-world addition and subtraction problems within 20 (e.g., 3 people are on a bus. More people get on. There are now 7 people on the bus. How many people got on the bus?).	<b>A3.2.2_E</b>	Find a missing value in a number sentence using addition and subtraction of numbers within 100 (e.g., $23 + \_ = 59$ ).
<b>A3.2.3_P</b>	N/A	<b>A3.2.3_M</b>	N/A	<b>A3.2.3_E</b>	Represent real-world addition and subtraction problems within 20 using a number sentence with a symbol or blank to represent the missing value (e.g., 13 people are on a bus. More people get on. There are now 7 people on the bus. How many people got on the bus? Represent this situation with an addition or a subtraction sentence with a symbol or blank to represent the missing value).

## GRADE 4. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
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### N: NUMBER KNOWLEDGE

#### NI: WHOLE NUMBERS

##### NI.1: Identify and count in whole numbers, and identify relative magnitude

NI.1.1_P	Count in whole numbers up to 1000.	NI.1.1_M	Count in whole numbers up to 10,000.	NI.1.1_E	Count in whole numbers greater than 10,000.
NI.1.2_P	Read and write whole numbers up to 1000 in words and numerals.	NI.1.2_M	Read and write whole numbers up to 10,000 in words and numerals.	NI.1.2_E	Read and write whole numbers greater than 10,000 in words and numerals.
NI.1.3_P	Compare and order whole numbers up to 1000.	NI.1.3_M	Compare and order whole numbers up to 10,000.	NI.1.3_E	Compare and order whole numbers up to 100,000.
NI.1.4_P	Skip count backwards by tens.	NI.1.4_M	Skip count forwards and backwards by hundreds.	NI.1.4_E	Skip count forwards and backwards by thousands.

##### NI.2: Represent whole numbers in equivalent ways

NI.2.1_P	Use place-value concepts for tens and ones (e.g., <i>compose or decompose a two-digit whole number using a number sentence such as <math>35 = 3 \text{ tens and } 5 \text{ ones}</math>, <math>35 = 30 + 5</math> or using number bonds, determine the value of a digit in the tens and ones place</i> ).	NI.2.1_M	Use place-value concepts for hundreds, tens, and ones (e.g., <i>compose or decompose a three-digit whole number using a number sentence such as <math>254 = 2 \text{ hundreds, } 5 \text{ tens and } 4 \text{ ones}</math>; <math>254 = 200 + 50 + 4</math>; determine the value of a digit in the hundreds place</i> ).	NI.2.1_E	Use place-value concepts for thousands, hundreds, tens, and ones (e.g., <i>compose or decompose a four-digit whole number using a number sentence such as <math>1383 = 1 \text{ thousand } 3 \text{ hundreds, } 8 \text{ tens and } 3 \text{ ones}</math>; <math>1383 = 1000 + 300 + 80 + 3</math>; determine the value of a digit in the thousands place</i> ).
NI.2.2_P	N/A	NI.2.2_M	Round whole numbers to the nearest ten.	NI.2.2_E	Round whole numbers to the nearest hundred.

##### NI.3: Solve operations using whole numbers

NI.3.1_P	Add and subtract within 100 (i.e., where the sum or minuend does not surpass 100), with and without regrouping, and represent these operations with objects, pictures, or symbols (e.g., $32 + 59$ ; <i>solve an addition or subtraction problem presented by images of bundles of 10s and ones; use skips on a numberline or on a hundreds grid to reason through or solve addition and subtraction problems</i> ).	NI.3.1_M	Add and subtract within 1000 (i.e., where the sum or minuend does not surpass 1000), with and without regrouping, and represent these operations with objects, pictures, or symbols (e.g., $550 + 250$ ; $457 - 129$ ; <i>use hundreds grids, number lines, or multibase arithmetic blocks to reason through or solve addition and subtraction problems</i> ).	NI.3.1_E	Add and subtract beyond 1000 (i.e., where the sum or minuend surpasses 1000), with and without regrouping, and represent these operations with objects, pictures, or symbols (e.g., $1457 - 129$ ; <i>use number lines to reason through or solve addition and subtraction problems</i> ).
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## GRADE 4. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
N1.3.2_P	Demonstrate fluency with multiplication facts up to $5 \times 5$ (i.e., $1 \times 1$ up to $5 \times 5$ ) and related division facts, including the relationship between them.	N1.3.2_M	Demonstrate fluency with multiplication facts up to $10 \times 10$ (i.e., $1 \times 1$ up to $10 \times 10$ ) and related division facts, including the relationship between them.	N1.3.2_E	Demonstrate fluency with multiplication facts up to $12 \times 12$ (i.e., $1 \times 1$ up to $12 \times 12$ ) and related division facts, including the relationship between them.
N1.3.3_P	Perform calculations involving two or more operations, within the limits for partially meets expectations described above, when order of operations is not a factor (e.g., $5 \times 5 + 19 = \underline{\quad}$ ; $72 - 9 - 15 = \underline{\quad}$ ).	N1.3.3_M	Perform calculations involving two or more operations, within the limits for meets expectations described above, when order of operations is not a factor (e.g., $6 \times 7 + 519 = \underline{\quad}$ ; $6 \times 4 \div 8 = \underline{\quad}$ ).	N1.3.3_E	Perform calculations involving two or more operations, within the limits for exceeds expectations described above, when order of operations is not a factor (e.g., $6 \times 12 + 1542 = \underline{\quad}$ ; $12 \times 9 - 19 = \underline{\quad}$ ).
<b>N1.4: Solve real-world problems involving whole numbers</b>					
N1.4.1_P	Solve simple real-world problems involving addition and subtraction of whole numbers within 100 (i.e., where the sum or minuend does not surpass 100) without regrouping, including problems involving measurement and currency units (e.g., <i>There are 33 sheep in a field. 25 more sheep come into the field. How many sheep are in the field now?; There are 54 children in total in grade 3. Thirteen are absent today. How many grade 3 children are at school today?</i> ).	N1.4.1_M	Solve simple real-world problems involving addition and subtraction of whole numbers within 100 (i.e., where the sum or minuend does not surpass 100) with and without regrouping, including problems involving measurement and currency units (e.g., <i>There are 34 sheep in a field. 29 more sheep come into the field. How many sheep are in the field now?; There are 54 children in total in grade 4. Seven are absent today. How many grade 4 children are at school today?</i> ).	N1.4.1_E	Solve simple real-world problems involving addition and subtraction of whole numbers within 1,000 (i.e., where the sum or minuend does not surpass 1,000) with and without regrouping, including problems involving measurement and currency units (e.g., <i>There were 740 people living in a town. Eighty-three more people come to live in the town. What is the total number of people living in the town now?; There are 750 people living in a town. Only 327 of them were born in the town. How many were born outside the town?</i> ).
N1.4.2_P	N/A	N1.4.2_M	Solve simple real-world problems involving the multiplication of two whole numbers to 5, and associated division facts (e.g., <i>Amina is putting fruit into bags. Each bag will contain 4 pieces of fruit. How many bags will Amina need for 20 pieces of fruit?; Amina has 5 bags. Each bag contains 4 pieces of fruit. How many pieces of fruit are there in total?</i> ).	N1.4.2_E	Solve simple real-world problems involving the multiplication of two whole numbers to 10, and associated division facts (e.g., <i>Amina is putting fruit into bags. Each bag will contain 7 pieces of fruit. How many bags will Amina need for 28 pieces of fruit?; Amina has 4 bags. Each bag contains 7 pieces of fruit. How many pieces of fruit are there in total?</i> ).

## N2: FRACTIONS

## GRADE 4. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
<b>N2.1: Identify and represent fractions using objects, pictures, and symbols, and identify relative magnitude</b>					
N2.1.1_P	Identify unit and non-unit fractions with denominators up to 12 (e.g., $1/5$ ; $4/7$ ; $1/8$ ; $9/10$ ) represented as objects or pictures (as part of a whole or part of a set) and express them in fractional notation (e.g., shade $1/5$ of this shape; indicate $5/6$ of these objects when arranged in a 5 by 6 array).	N2.1.1_M	Identify and express everyday unit fractions (e.g., $1/2$ ; $1/3$ ; $1/4$ ) as equivalent fractions when the fractional notations are accompanied by pictures or objects (e.g., $1/3 = 2/6$ when the task is supported by pictures; $1/2 = 3/6$ ).	N2.1.1_E	Identify and express proper fractions as equivalent fractions with denominators up to 12 (e.g., express a fraction in simplest form $6/9 = 2/3$ ; $2/10 = 1/5$ ; express a fraction as a multiple of another $4/5 = 8/10$ ).
N2.1.2_P	Compare and order fractions with the same denominators (e.g., $1/8$ ; $3/8$ ; $5/8$ ).	N2.1.2_M	Compare and order everyday unit fractions (e.g., $1/4$ ; $1/3$ ; $1/2$ ).	N2.1.2_E	Compare and order fractions with different but related denominators up to 12 (e.g., $2/3$ and $5/6$ ).
<b>N2.2: Solve operations using fractions</b>					
N2.2.1_P	Add and subtract proper fractions with the same denominator when fractions are represented with pictures (e.g., given an image of a rectangle divided into five equal parts, with three parts shaded one color and 1 part shaded another color, calculate the fraction of the rectangle that is shaded. Or, when presented with an image of an orange with 6 equal pieces, two of which are shaded, calculate the fraction that is not shaded).	N2.2.1_M	Add and subtract proper fractions with the same denominator when fractions are represented with symbols, and represent such additions with objects or pictures (e.g., $2/3 + 1/3$ ; $3/5 - 1/5$ ; add $2/5$ and $1/5$ , or subtract $3/8$ from $6/8$ using fraction bars).	N2.2.1_E	Add and subtract proper fractions with different but related denominators when fractions are represented with symbols, and represent such additions with objects or pictures (e.g., $2/3 + 1/6$ ; $7/8 - 1/4$ ; add $1/6$ and $1/3$ , or subtract $1/3$ from $7/9$ using fraction bars).
N2.2.2_P	N/A	N2.2.2_M	N/A	N2.2.2_E	Represent the multiplication of a commonly-used fraction and a whole number with objects or pictures (e.g., represent $3/4 \times 12$ by drawing 12 objects, dividing them into four equal groups, and coloring three of the groups).

## GRADE 4. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
<b>N2.3: Solve real-world problems involving fractions</b>		
N2.3.1_P N/A	N2.3.1_M Solve real-world problems involving addition and subtraction of proper fractions with the same denominators (e.g., Paola has 2/5 of a chocolate bar left. Her friend Carola has 1/5th of the same chocolate bar. Together, they have what fraction of the chocolate bar?; Paola ate 2/5 of a chocolate bar at recess. How much of the chocolate bar is left?).	N2.3.1_E Solve real-world problems involving addition and subtraction of proper fractions with different but related denominators (e.g., Paola has 2/5 of a chocolate bar left. Her friend Carola has 3/10 of the same chocolate bar. Together, they have what fraction of the chocolate bar?; Paola has 2/3 of a chocolate bar left. If she gives her friend Carola 1/6 of what remains, what fraction of the chocolate bar will Paola have left?).
<b>M: MEASUREMENT</b>		
<b>MI: LENGTH, WEIGHT, CAPACITY, VOLUME, AREA, AND PERIMETER</b>		
<b>MI.1: Use non-standard and standard units to measure, compare, and order</b>		
MI.1.1_P Use standard units to compare length and weight when provided the unit of measurement (e.g., identify that the pencil is one centimeter longer than the crayon).	MI.1.1_M Select and use appropriate standard units to estimate, measure, and compare length and weight when measurements involve whole numbers only (e.g., choose centimeters instead of meters to measure a pencil; estimate the weight of the apple when given the following choices: A. 5g B. 200g C. 1kg D. 5kg).	MI.1.1_E Identify the relationship between the relative size of adjacent units within a standard system of measurement for length and weight (e.g., identify the number of millimeters in a centimeter).
MI.1.2_P Use non-standard units to estimate or measure volume/capacity (e.g., fill a container with scoops of sand; which box would hold most balls?).	MI.1.2_M Select and use appropriate standard units to measure and compare capacity/volume when measurements involve whole numbers only (e.g., the measuring cups contain 200 ml of water and 100 ml of oil).	MI.1.2_E Identify the relationship between the relative size of adjacent units within a standard system of measurement for capacity/volume (e.g., identify the number of pints in a quart).
<b>MI.2: Solve problems involving measurement</b>		
MI.2.1_P Solve problems, including real-world problems, involving the perimeter of a rectangle using concrete or pictorial representations of units (e.g., grid squares).	MI.2.1_M Calculate the perimeter of a polygon.	MI.2.1_E Solve problems, including real-world problems, involving the perimeter of a polygon.

## GRADE 4. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
M1.2.2_P	N/A	M1.2.2_M	Solve problems, including real-world problems, involving the area of a rectangle using concrete or pictorial representations of units (e.g., grid squares or tiles).	M1.2.2_E	Solve problems, including real-world problems, involving the calculation of the area of a rectangle.
<b>M2: TIME</b>					
<b>M2.1: Tell time</b>					
M2.1.1_P	Tell time using an analog clock to the nearest half hour.	M2.1.1_M	Tell time using an analog clock to the nearest minute.	M2.1.1_E	Recognize equivalence between representations of time (e.g., digital, analog, and written; 15 minutes is a quarter of an hour).
M2.1.2_P	Recognize the number of hours in a day, minutes in an hour, and seconds in a minute.	M2.1.2_M	N/A	M2.1.2_E	N/A
<b>M2.2: Solve problems involving time</b>					
M2.2.1_P	Solve problems, including real-world problems, involving elapsed time in hours and half-hours (e.g., calculate the difference between 2:00 and 5:30 or the difference between 16:00 and 16:30).	M2.2.1_M	Solve problems, including real-world problems, involving elapsed time in minutes within an hour (e.g., calculate the difference between 3:42 and 3:56 or the difference between 16:35 and 16:52).	M2.2.1_E	Solve problems, including real word problems, involving elapsed time in minutes across hours (e.g., calculate the difference between 3:24 and 5:12 or the difference between 16:35 and 18:22), including problems involving schedules (i.e., timetables, agendas, itineraries).
M2.2.2_P	N/A	M2.2.2_M	N/A	M2.2.2_E	Solve problems, including real-world problems, involving the number of days in a week, months in a year, hours in a day, minutes in an hour, and seconds in a minute.

### M3: CURRENCY

M3.1: Use different currency units to create amounts - subconstruct fully covered in grades 1-3. Questions involving currency are covered under the relevant real-world problem subconstructs (e.g., NI.4 for whole numbers, etc.)

## G: GEOMETRY

### GI: PROPERTIES OF SHAPES AND FIGURES

## GRADE 4. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
<b>G1.1: Recognize and describe shapes and figures</b>					
G1.1.1_P	Recognize and name two-dimensional shapes and familiar three-dimensional figures in everyday life.	G1.1.1_M	Recognize and name two-dimensional shapes by a written or spoken description of their simple attributes (e.g., name a shape given a description of the number of sides or corners or the relative length of the sides, etc.).	G1.1.1_E	Recognize and name types of triangles (e.g., isosceles, scalene, equilateral, and right angle).
G1.1.2_P	N/A	G1.1.2_M	N/A	G1.1.2_E	Recognize and name three-dimensional figures by their attributes (i.e., faces, edges, vertices).
G1.1.3_P	N/A	G1.1.3_M	N/A	G1.1.3_E	Recognize types of angles by their magnitude (e.g., right, straight, acute, obtuse).
G1.1.4_P	Identify a line of symmetry in two-dimensional shapes.	G1.1.4_M	Recognize and describe the congruence and similarity of two-dimensional shapes (e.g., when shown two shapes, explain how they are similar using mathematical or non-mathematical language - 'It got bigger and has been turned' or 'It's been enlarged and rotated').	G1.1.4_E	N/A
<b>G2: SPATIAL VISUALIZATIONS</b>					
<b>G2.1: Compose and decompose shapes and figures</b>					

## GRADE 4. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
<p>G2.1.1_P</p> <p>Use a small number of given shapes to compose multiple larger two-dimensional shapes (e.g., <i>identify which of these larger shapes can be made from the smaller shapes?</i>) and decompose a larger shape into a given number of smaller shapes (e.g., <i>draw one line on the triangle below to show how it can be cut into exactly two smaller triangles.</i>).</p>	<p>G2.1.1_M    N/A</p>	<p>G2.1.1_E</p> <p>Identify the net of a cube or specific faces on the net of a cube (e.g., <i>fold mentally to answer the question, which of these is the net of a cube?; identify opposite faces on a net.</i>).</p>

### G3: POSITION AND DIRECTION

#### G3.1: Describe the position and direction of objects in space

<p>G3.1.1_P</p> <p>Accurately use the terms left and right, and use simple maps to describe locations using positional terms (e.g., <i>answer, "Where is the teacher's desk?" To the (left) of the chalkboard.</i>).</p>	<p>G3.1.1_M</p> <p>Use different kinds of simple maps (e.g., <i>an alpha-numeric map, grid map, or local equivalent</i>) to give and follow 2-step directions to a given location (e.g., <i>Using this map, if you are at the school, you walk towards the tree, and turn left. What would you be facing?; Using this map, how do you get from the school to the green house?</i>).</p>	<p>G3.1.1_E</p> <p>Use a grid map with compass directions when the grid dimensions are given in terms of the real-world distance (e.g., <i>Which of these is closest to the distance between the park and Juan's house? A. 100 meters B. 150 meters C. 200 meters D. 250 meters.</i>).</p>
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### S: STATISTICS AND PROBABILITY

#### S1: DATA MANAGEMENT

##### S1.1: Retrieve and interpret data presented in displays

## GRADE 4. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency		
SI.1.1_P	Solve a problem involving the sum of or difference between two specified categories of a tally chart, bar graph, or pictograph with a single-unit scale (e.g., <i>How many children like red and blue in this bar graph?</i> ).	SI.1.1_M	Solve a problem involving more than two pieces of information from a tally chart, bar graph, or pictograph with a single-unit scale (e.g., <i>How many children were asked about their favorite color in this bar graph?</i> ).	SI.1.1_E	Organize data and construct a tally chart, bar graph, or pictograph that arranges data into categories and uses a single- or multi-unit scale.
SI.1.2_P	N/A	SI.1.2_M	Complete missing information in a tally chart, bar graph, or pictograph that arranges data into categories and uses a single-unit scale (e.g., <i>add a row or column to a partially completed pictograph</i> ).	SI.1.2_E	Compare by calculating differences between categories in a tally chart, bar graph, or pictograph with a multi-unit scale.
SI.1.3_P	N/A	SI.1.3_M	Retrieve information from a tally chart, bar graph, or pictograph with a multi-unit scale.	SI.1.3_E	N/A

### A: ALGEBRA

#### AI: PATTERNS

##### AI.1: Recognize, describe, extend, and generate patterns

AI.1.1_P	Describe repeating patterns (e.g., <i>explain that ○□□ repeats three times in the following set ○□□ ○□□ ○□□; explain that 1, 2, 3, 4 repeats three times in the following set 1, 2, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4</i> ).	AI.1.1_M	Describe numerical patterns that increase or decrease by a constant value with a simple rule, and use this information to identify a missing element or extend the pattern (e.g., <i>describe the pattern 6, 9, 12, 15 as going up by 3s; identify the missing element in the pattern 3, 7, 11, __, 19; extend the pattern 6, 11, 16, 21, )</i> ).	AI.1.1_E	Describe numerical patterns that increase or decrease by a constant multiplier, and use this information to identify a missing element or extend the pattern (e.g., <i>describe that the pattern 2, 4, 8, 16 starts at 2 and doubles or that the pattern 20, 10, 5, 2.5 starts at 20 and halves; identify the missing element in the pattern 3, 6, __, 24, 48; write the next two numbers in the pattern 80, 40, 20, 10</i> ).
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## GRADE 4. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
<p><b>A2: EXPRESSIONS</b> Not applicable to grade 4</p>		
<p><b>A3: RELATIONS AND FUNCTIONS</b> A3.1: Variation (ratio, proportion, and percentage) - not applicable to grade 4</p>		
<p><b>A3.2: Demonstrate an understanding of equivalency</b></p>		
<p>A3.2.1_P Create a numerical expression using + or - to model a situation (e.g., represent the following in a number sentence: 3 people are on a bus, and 4 more get on).</p>	<p>A3.2.1_M Create a numerical expression using <math>\times</math> or <math>\div</math> to model a situation (e.g., represent the following in a number sentence - 3 people get on the bus at each of four stops).</p>	<p>A3.2.1_E N/A</p>
<p>A3.2.2_P Find a missing value in real-world addition and subtraction problems within 20 (e.g., 3 people are on a bus. More people get on. There are now 7 people on the bus. How many people got on the bus?).</p>	<p>A3.2.2_M Find a missing value in a number sentence using addition and subtraction of numbers within 100 (e.g., <math>23 + \underline{\quad} = 59</math>).</p>	<p>A3.2.2_E N/A</p>
<p>A3.2.3_P N/A</p>	<p>A3.2.2_M Represent real-world addition and subtraction problems within 20 using a number sentence with a symbol or blank to represent the missing value (e.g., 13 people are on a bus. More people get on. There are now 7 people on the bus. How many people got on the bus? Represent this situation with an addition or a subtraction sentence).</p>	<p>A3.2.2_E Represent real-world problems involving the multiplication of two whole numbers to 10 and related division facts, using a number sentence with a symbol or blank to represent the missing value (e.g. Paul has three bags of oranges. There are the same number of oranges in each bag. He has 18 oranges altogether. How many oranges are there in each bag? Represent the situation with a multiplication sentence)</p>



## GRADE 5. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
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### N: NUMBER KNOWLEDGE

#### NI: WHOLE NUMBERS

##### NI.1: Identify and count in whole numbers, and identify relative magnitude

NI.1.1_P	Count in whole numbers up to 10,000.	NI.1.1_M	Count in whole numbers up to any whole number.	NI.1.1_E	N/A
NI.1.2_P	Read and write whole numbers up to 10,000 in words and numerals.	NI.1.2_M	Read and write whole numbers greater than 10,000 in words and numerals.	NI.1.2_E	N/A
NI.1.3_P	Compare and order whole numbers up to 10,000.	NI.1.3_M	Compare and order whole numbers up to 100,000.	NI.1.3_E	Compare and order whole numbers greater than 100,000.
NI.1.4_P	Skip count forwards and backwards by hundreds.	NI.1.4_M	Skip count forwards and backwards by thousands.	NI.1.4_E	N/A

##### NI.2: Represent whole numbers in equivalent ways

NI.2.1_P	Use place-value concepts for hundreds, tens, and ones ( <i>e.g., compose or decompose a three-digit whole number using a number sentence such as <math>254 = 2</math> hundreds, 5 tens and 4 ones; <math>254 = 200 + 50 + 4</math>; determine the value of a digit in the hundreds place</i> ).	NI.2.1_M	Use place-value concepts for thousands, hundreds, tens, and ones ( <i>e.g., compose or decompose a four-digit whole number using a number sentence such as <math>1,383 = 1</math> thousand 3 hundreds, 8 tens and 3 ones; <math>1383 = 1,000 + 300 + 80 + 3</math>; determine the value of a digit in the thousands place</i> ).	NI.2.1_E	Use place-value concepts beyond the thousands ( <i>e.g., compose or decompose a seven-digit whole number using a number sentence such as <math>1,383,547 = 1</math> million, 3 hundred thousands, 8 ten thousands, 3 thousands, 5 hundreds, four tens and 7 ones; <math>1,383,547 = 1,000,000 + 300,000 + 80,000 + 3000 + 500 + 40 + 7</math>; determine the value of a digit in the millions place</i> ).
NI.2.2_P	Round whole numbers to the nearest ten.	NI.2.2_M	Round whole numbers to the nearest hundred.	NI.2.2_E	Round whole numbers to the nearest thousand.

##### NI.3: Solve operations using whole numbers

NI.3.1_P	Add and subtract within 1000 (i.e., where the sum or minuend does not surpass 1000), with and without regrouping, and represent these operations with objects, pictures, or symbols ( <i>e.g., <math>550 - 250</math>; <math>457 - 129</math>; use hundreds grids, number lines, or multibase arithmetic blocks to reason through or solve addition and subtraction problems</i> ).	NI.3.1_M	Add and subtract beyond 1000 (i.e., where the sum or minuend surpasses 1000), with and without regrouping, and represent these operations with objects, pictures, or symbols ( <i>e.g., <math>1457 - 129</math>; use number lines to reason through or solve addition and subtraction problems</i> ).	NI.3.1_E	N/A
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## GRADE 5. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
NI.3.2_P	Multiply, with and without regrouping, and divide, with no remainder, a two-digit number by a one-digit number (e.g., $42 \times 4 = \underline{\quad}$ ; $42 \times 6 = \underline{\quad}$ ; $80 \div 5 = \underline{\quad}$ ).	NI.3.2_M	Multiply, with and without regrouping, and divide, with no remainder, any number by a one-digit numbers and multiply two, two-digit numbers, with and without regrouping (e.g., $342 \times 4 = \underline{\quad}$ ; $42 \times 34 = \underline{\quad}$ ; $1380 \div 5 = \underline{\quad}$ ).	NI.3.2_E	Multiply any number by a two-digit number, with and without regrouping, and divide any number by a one-digit number, with remainder (e.g., $3427 \times 68$ ; $1380 \div 6 = \underline{\quad}$ ).
NI.3.3_P	Perform calculations involving two or more operations, within the limits for partially meets expectations described above, respecting the order of operations (e.g., $6 + 7 \times 57 = \underline{\quad}$ ; $996 - 440 \div 8 = \underline{\quad}$ ).	NI.3.3_M	Perform calculations involving two or more operations, within the limits for meets expectations described above, respecting the order of operations (e.g., $1754 + 53 \times 53 = \underline{\quad}$ ; $4 \times 9 \times 8 = \underline{\quad}$ ).	NI.3.3_E	Perform calculations involving two or more operations, within the limits for exceeds expectations described above, respecting the order of operations (e.g., $6584 + 2187 \times 38 = \underline{\quad}$ ; $675 \div 9 \times 652 = \underline{\quad}$ ).
<b>NI.4: Solve real-world problems involving whole numbers</b>					
NI.4.1_P	Solve simple real-world problems involving addition and subtraction of whole numbers within 100 (i.e., where the sum or minuend does not surpass 100) with regrouping, including problems involving measurement and currency units (e.g., <i>There are 34 sheep in a field. 29 more sheep come into the field. How many sheep are in the field now?; There are 54 children in total in grade 5. Seven are absent today. How many grade 5 children are at school today?</i> ).	NI.4.1_M	Solve simple real-world problems involving addition and subtraction of whole numbers within 1000 (i.e., where the sum or minuend does not surpass 1,000) with and without regrouping, including problems involving measurement and currency units (e.g., <i>There were 740 people living in a town. Eighty-three more people come to live in the town. What is the total number of people living in the town now?; There are 750 people living in a town. Only 327 of them were born in the town. How many were born outside the town?</i> ).	NI.4.1_E	Solve real-world problems involving combinations of any <b>two or more</b> of the four operations, including problems involving measurement and currency units and: * the addition and subtraction of whole numbers beyond 1000, with and without regrouping * the multiplication and division of any number by a one-digit number, with and without regrouping (multiplication), and with and without a remainder (division) * the multiplication of two, two-digit numbers.
NI.4.2_P	Solve simple real-world problems involving the multiplication of two whole numbers to 5, and associated division facts (e.g., <i>Amina is putting fruit into bags. Each bag will contain 4 pieces of fruit. How many bags will Amina need for 20 pieces of fruit?; Amina has 5 bags. Each bag contains 4 pieces of fruit. How many pieces of fruit are there in total?</i> ).	NI.4.2_M	Solve simple real-world problems involving the multiplication of two whole numbers to 10, and associated division facts (e.g., <i>Amina is putting fruit into bags. Each bag will contain 7 pieces of fruit. How many bags will Amina need for 28 pieces of fruit?; Amina has 4 bags. Each bag contains 7 pieces of fruit. How many pieces of fruit are there in total?</i> ).	NI.4.2_E	N/A

### N2: FRACTIONS

## GRADE 5. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
<b>N2.1: Identify and represent fractions using objects, pictures, and symbols, and identify relative magnitude</b>					
N2.1.1_P	Identify and express everyday unit fractions (e.g., $1/2$ ; $1/3$ ; $1/4$ ) as equivalent fractions represented as objects or pictures (e.g., $1/3 = 2/6$ when the task is supported by pictures; $1/2 = 3/6$ ).	N2.1.1_M	Identify and express proper fractions as equivalent fractions with denominators up to 12 (e.g., express a fraction in simplest form $6/9 = 2/3$ ; $2/10 = 1/5$ ; express as a multiple of another $4/5 = 8/10$ ).	N2.1.1_E	Identify and express proper fractions as equivalent fractions (any denominator) (e.g., $13/25 = 26/50$ ).
N2.1.2_P	N/A	N2.1.2_M	N/A	N2.1.2_E	Identify and express improper fractions as equivalent mixed numbers (or vice versa), with pictures or symbols (e.g., represent $9/6$ as $1\ 3/6$ or $1\ 1/2$ ; use two arrays or rectangles and coloring to represent $9/6$ ).
N2.1.3_P	Compare and order everyday unit fractions (e.g., $1/4$ ; $1/3$ ; $1/2$ ).	N2.1.3_M	Compare and order fractions with different but related denominators up to 12 (e.g., $2/3$ and $5/6$ ).	N2.1.3_E	Compare and order proper fractions with different denominators (e.g., $1/4$ ; $7/10$ ; $5/6$ ).
<b>N2.2: Solve operations using fractions</b>					
N2.2.1_P	Add and subtract proper fractions with the same denominator (e.g., $2/3 + 1/3$ ; $3/5 - 1/5$ ).	N2.2.1_M	Add and subtract proper fractions with different but related denominators (e.g., $2/3 + 1/6$ ; $7/8 - 1/4$ ).	N2.2.1_E	Add and subtract improper fractions or mixed numbers with different but related denominators (e.g., $2\ 2/3 + 1\ 1/6$ ; $25/4 + 5/12$ ).

## GRADE 5. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
N2.2.2_P	N/A	N2.2.2_M	Multiply commonly-used fractions by whole numbers, or divide proper fractions by whole numbers, and represent such operations with objects or pictures (e.g., represent $3/4 \times 12$ with 3 by 4 grid with 3 of the columns colored in; or represent $3/4$ divided by 2 as a $1 \times 1$ grid with one side divided into four equal parts and three blocks colored in and then other side divided into 2 to produce 8 equal blocks with 6 colored in).	N2.2.2_E	Multiply and divide proper fractions and divide improper fractions by whole numbers, and represent such operations with pictures or symbols (e.g., $2/5 \div 3/5$ ; $3/4 \times 2/6$ ; $7/5 \div 2$ ; represent $3/4 \times 1/2$ as a rectangle split into four equal parts with three parts shaded and each of the four equal parts split into 2 equal. Note that the smaller shaded sections represent the answer).
<b>N2.3: Solve real-world problems involving fractions</b>					
N2.3.1_P	Solve real-world problems involving addition and subtraction of proper fractions with the same denominators (e.g., Paola has $2/5$ of a chocolate bar left. Her friend Carola has $1/5$ th of the same chocolate bar. Together, they have what fraction of the chocolate bar?; Paola ate $2/5$ of a chocolate bar at recess. How much of the chocolate bar is left?).	N2.3.1_M	Solve real-world problems involving addition and subtraction of proper fractions with different but related denominators (e.g., Paola has $2/5$ of a chocolate bar left. Her friend Carola has $3/10$ of the same chocolate bar. Together, they have what fraction of the chocolate bar?; Paola has $2/3$ of a chocolate bar left. If she gives her friend Carola $1/6$ of what remains, what fraction of the chocolate bar will Paola have left?).	N2.3.1_E	Solve real-world problems involving addition and subtraction of improper fractions and mixed numbers with different but related denominators (e.g., Maya is cutting some oranges for a picnic. She cuts each orange into 8 equal pieces. She puts 25 pieces of orange onto a large plate and 11 pieces of orange onto a smaller plate. What is the smallest number of whole oranges Maya could have cut?; A tree is now 3 and a half meters tall. When it was planted, it was 1 and one quarter meters tall. By how many meters has the tree grown since it was planted?).
N2.3.2_P	N/A	N2.3.2_M	Solve real-world problems involving the multiplication and division of a proper fraction and a whole number (e.g., Misha has half a pizza. If she shares it with her brother, what fraction of the original pizza will each receive?).	N2.3.2_E	Solve real-world problems involving the multiplication of two proper fractions or the division of an improper fraction or mixed number by a whole number (e.g., Misha has half a pizza. If she shares it equally with her brother, what fraction of the original pizza will each receive?).
<b>N3: DECIMALS</b>					
<b>N3.1: Identify and represent decimals using objects, pictures, and symbols, and identify relative magnitude</b>					
N3.1.1_P	Identify and represent decimal quantities to the tenths using objects or pictures (e.g., represent 0.8 by coloring 8 of 10 equal parts of a rectangle).	N3.1.1_M	Identify and represent quantities using decimal notation (i.e., symbols) up to the tenths place (e.g., identify that 0.8 is 8 tenths).	N3.1.1_E	Identify and represent quantities using decimal notation up to the hundredths place (e.g., identify 0.65 is 65 hundredths).

## GRADE 5. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
N3.1.2_P	N/A	N3.1.2_M	Compare and order decimal numbers up to the tenths place (e.g., <i>sort the following decimals from high to low: 0.8, 0.3, 0.1</i> ).	N3.1.2_E	Compare and order decimal numbers up to the hundredths place (e.g., <i>sort the following decimals from high to low: 0.8, 0.33, 0.08, 0.6</i> ).
<b>N3.2: Represent decimals in equivalent ways (including fractions and percentages)</b>					
N3.2.1_P	Round decimal numbers to the nearest whole number (e.g., <i>round 3.4 to 3</i> ).	N3.2.1_M	Round decimal numbers to the nearest tenths place (e.g., <i>round 3.46 to 3.5</i> ).	N3.2.1_E	Round decimal numbers to the nearest hundredths place (e.g., <i>round 3.456 to 3.46</i> ).
N3.2.2_P	N/A	N3.2.2_M	Identify and express fractions with denominators of 10 using decimal notation (e.g., <i>7/10 = 0.7</i> ).	N3.2.2_E	Identify and express fractions with denominators of 100 and everyday fractions, using decimal notation, and represent fractions with denominators of 100 as percentages (e.g., <i>3/4 = 0.75; 72/100 = 0.72 = 72%</i> ).
<b>N3.3: Solve operations using decimals</b>					
N3.3_P	N/A	N3.3_M	Add and subtract decimal numbers up to the tenths place. Create or identify concrete or picture models to represent such additions (e.g., <i>0.5 + 0.2</i> ).	N3.3_E	Add and subtract decimal numbers up to the hundredths place. Create or identify concrete or picture models to represent such additions (e.g., <i>3.41 + 5.3</i> ).

### M: MEASUREMENT

#### MI: LENGTH, WEIGHT, CAPACITY, VOLUME, AREA, AND PERIMETER

##### MI.1: Use non-standard and standard units to measure, compare, and order

MI.1.1_P	Select and use appropriate standard units to estimate, measure, and compare length and weight when measurements involve whole numbers only (e.g., <i>choose centimeters instead of meters to measure a pencil; estimate the weight of the apple when given the following choices: A. 5g B. 200g C. 1kg D. 5kg</i> ).	MI.1.1_M	Identify the relationship between the relative size of adjacent units within a standard system of measurement for length and weight (e.g., <i>identify the number of millimeters in a centimeter</i> ).	MI.1.1_E	Make conversions between adjacent units of length and weight within a standard system of measurement (e.g., <i>identify that the 16 centimeter pencil is 160 millimeters long</i> ).
MI.1.2_P	Select and use appropriate standard units to measure and compare capacity/volume when measurements involve whole numbers only (e.g.,	MI.1.2_M	Identify the relationship between the relative size of adjacent units within a standard system of measurement for capacity/volume (e.g., <i>identify the number of pints in a quart</i> ).	MI.1.2_E	Make conversions between adjacent units of capacity/volume within a standard system of measurement (e.g., <i>identify that there are four pints in a two-quart container</i> ).

## GRADE 5. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
	<i>identify that the measuring cups contain 200 ml of water and 100 ml of oil).</i>				
M1.1.3_P	N/A	M1.1.3_M	Read scales to the nearest marked increment on a variety of measuring tools involving fractions and decimals to the tenths place, containing both labeled and unlabeled scale increments <i>(e.g., read a kitchen scale containing increments expressed as fractions).</i>	M1.1.3_E	Read scales to the nearest marked increment on a variety of measuring tools involving decimals to the hundredths place, containing both labeled and unlabeled scale increments <i>(e.g., read a depth gauge in a dam with scale increments increasing in 25-centimeter intervals and labels expressed as decimal meters e.g., 1.25, 1.5, 1.75, 2.0 when the needle is pointing directly at a marked increment of the scale).</i>
<b>M1.2: Solve problems involving measurement</b>					
M1.2.1_P	Calculate the perimeter of a polygon.	M1.2.1_M	Solve problems, including real-world problems, involving the perimeter of a polygon.	M1.2.1_E	Solve problems, including real-world problems, involving comparing the perimeters of polygons.
M1.2.2_P	Solve problems, including real-world problems, involving the area of a rectangle using concrete or pictorial representations of units <i>(e.g., grid squares or tiles).</i>	M1.2.2_M	Solve problems, including real-world problems, involving the calculation of the area of a rectangle.	M1.2.2_E	Solve problems, including real-world problems, involving the area of compound shapes comprised of rectangles using concrete or pictorial representations of units <i>(e.g., grid squares or tiles).</i>
<b>M2: TIME</b>					
<b>M2.1: Tell time</b>					
M2.1.1_P	Tell time using an analog clock to the nearest minute.	M2.1.1_M	Recognize equivalence between representations of time <i>(e.g., digital, analog, and written; 15 minutes is a quarter of an hour).</i>	M2.1.1_E	N/A
<b>M2.2: Solve problems involving time</b>					
M2.2.1_P	Solve problems, including real-world problems, involving elapsed time in minutes within an hour <i>(e.g., calculate the difference between 3:42 and 3:56 or the difference between 16:35 and 16:52).</i>	M2.2.1_M	Solve problems, including real word problems, involving elapsed time in minutes across hours <i>(e.g., calculate the difference between 3:24 and 5:12 or the difference between 16:35 and 18:22), including</i>	M2.2.1_E	Solve problems, including real-world problems, involving elapsed time across AM and PM in countries that teach 12-hour time <i>(e.g., calculate the difference between 10:30am and 3:15pm).</i>

## GRADE 5. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
	<i>problems involving schedules (i.e., timetables, agendas, itineraries).</i>	
M2.2.2_P    N/A	M2.2.2_M    Solve problems, including real-world problems, involving the number of days in a week, months in a year, hours in a day, minutes in an hour, and seconds in a minute.	M2.2.2_E    N/A

### M3: CURRENCY

M3.1: Use different currency units to create amounts - subconstruct fully covered in grades 1-3. Questions involving currency are covered under the relevant real-world problem subconstructs (e.g.,N1.4 for whole numbers, etc.)

## G: GEOMETRY

### GI: PROPERTIES OF SHAPES AND FIGURES

GI.1: Differentiate shapes and figures by their attributes

GI.1.1_P	Recognize and name two-dimensional shapes by a written or spoken description of their simple attributes <i>(e.g., name a shape given a description of the number of sides or corners or the relative length of the sides, etc.)</i> .	GI.1.1_M	Recognize and name types of triangles <i>(e.g., isosceles, scalene, equilateral, and right angle)</i> .	GI.1.1_E	Recognize and name types of quadrilaterals <i>(e.g., parallelogram; trapezium, etc.)</i> .
GI.1.2_P	N/A	GI.1.2_M	Recognize and name three-dimensional figures by their attributes <i>(i.e., faces, edges, vertices)</i> .	GI.1.2_E	Identify parallel and perpendicular sides of shapes.
GI.1.3_P	N/A	GI.1.3_M	Recognize types of angles by their magnitude <i>(e.g., right, straight, acute, obtuse)</i> .	GI.1.3_E	N/A

## GRADE 5. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
<p>G1.1.4_P</p> <p>Recognize and describe the congruence and similarity of two-dimensional shapes (e.g., when shown two shapes, explain how they are similar using mathematical or non-mathematical language - 'It got bigger and has been turned' or 'It's been enlarged and rotated').</p>	<p>G1.1.4_M N/A</p>	<p>G1.1.4_E N/A</p>
<p><b>G2: SPATIAL VISUALIZATIONS</b></p> <p>G2.1: Compose and decompose shapes and figures</p>		
<p>G2.1.1_P N/A</p>	<p>G2.1.1_M</p> <p>Identify the net of a cube or specific faces on the net of a cube (e.g., fold mentally to answer the question, which of these is the net of a cube?; identify opposite faces on a net).</p>	<p>G2.1.1_E</p> <p>Identify front, top, and side views of a familiar three-dimensional figure (i.e. prism, cylinder, cone or pyramid) (e.g., identify that the top view of an upright cylinder is a circle).</p>
<p><b>G3: POSITION AND DIRECTION</b></p> <p>G3.1: Describe the position and direction of objects in space</p>		
<p>G3.1.1_P</p> <p>Use different kinds of simple maps (e.g., an alpha-numeric map, grid map, or local equivalent) to give and follow 2-step directions to a given location (e.g., Using this map, if you are at the school, you walk towards the tree, and turn left. What would you be facing?; Using this map, how do you get from the school to the green house?).</p>	<p>G3.1.1_M</p> <p>Use a grid map with compass directions when the grid dimensions are given in terms of the real-world distance (e.g., Which of these is closest to the distance between the park and Juan's house? A. 100 meters B. 150 meters C. 200 meters D. 250 meters).</p>	<p>G3.1.1_E</p> <p>Locate and plot points on a plane in the first quadrant of a Cartesian coordinate system.</p>

## S: STATISTICS AND PROBABILITY



## GRADE 5. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
<b>SI: DATA MANAGEMENT</b>		
<b>SI.1: Retrieve and interpret data presented in displays</b>		
<p>SI.1.1_P</p> <p>Solve a problem involving more than two pieces of information from a tally chart, bar graph, or pictograph with a single-unit scale (e.g., <i>How many children were asked about their favorite color in this bar graph?</i>).</p>	<p>SI.1.1_M</p> <p>Organize data and construct a tally chart, bar graph, or pictograph that arranges data into categories and uses a single- or multi-unit scale.</p>	<p>SI.1.1_E</p> <p>Retrieve information from data displays that arrange data into categories and sub-categories with a single- or multi-unit scale (e.g., <i>How many girls liked green in this bar chart?</i>).</p>
<p>SI.1.2_P</p> <p>Complete missing information in a tally chart, bar graph, or pictograph that arranges data into categories and uses a single-unit scale (e.g., <i>add a row or column to a partially completed pictograph</i>).</p>	<p>SI.1.2_M</p> <p>Compare by calculating differences between categories in a tally chart, bar graph, or pictograph with a multi-unit scale.</p>	<p>SI.1.2_E</p> <p>N/A</p>
<p>SI.1.3_P</p> <p>Retrieve information from a tally chart, bar graph, or pictograph with a multi-unit scale.</p>	<p>SI.1.3_M</p> <p>N/A</p>	<p>SI.1.3_E</p> <p>N/A</p>
<b>S2: CHANCE AND PROBABILITY</b>		
<b>S2.1: Describe the likelihood of events in different ways</b>		
<p>S2.1.1_P</p> <p>Identify the likelihood of an event happening as certain or impossible (e.g., <i>There are blue, green, red, and yellow marbles in a bag. Which color is impossible to choose? and the choices are a) blue, b) green, c) purple, d) yellow, e) red.</i>).</p>	<p>S2.1.1_M</p> <p>Identify the likelihood of an event happening as likely or unlikely (e.g., <i>There are 9 blue, 1 red, 1 green, 1 yellow marbles in a bag. Which color is likely to be selected?</i>).</p>	<p>S2.1.1_E</p> <p>Compare the likelihoods of two or more events happening, using descriptive words (e.g., <i>Given a picture of a spinner with five equal colored sections - red, blue, yellow, green and purple, 'If the spinner is spun two times, what is the chance that it will land on blue both times?') A) impossible, B) unlikely, C) likely, and D) certain</i>).</p>

## GRADE 5. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
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### A: ALGEBRA

#### AI: PATTERNS

##### AI.1: Recognize, describe, extend, and generate patterns

<p><b>A1.1.1_P</b> Describe numerical patterns that increase or decrease by a constant value with a simple rule, and use this information to identify a missing element or extend the pattern (e.g., describe the pattern 6, 9, 12, 15 as going up by 3s; identify the missing element in the pattern 3, 7, 11, __, 19; extend the pattern 6, 11, 16, 21, ).</p>	<p><b>A1.1.1_M</b> Describe numerical patterns that increase or decrease by a constant multiplier, and use this information to identify a missing element or extend the pattern (e.g., describe that the pattern 2, 4, 8, 16 starts at 2 and doubles or that the pattern 20, 10, 5, 2.5 starts at 20 and halves; identify the missing element in the pattern 3, 6, __, 24, 48; write the next two numbers in the pattern 80, 40, 20, 10).</p>	<p><b>A1.1.1_E</b> Generate a pattern from a given rule, or match a pattern to a given rule using any operation (e.g., start at 5 and increase by 3 to generate 5, 8, 11, 14, 17 . . .; match the pattern 3, 6, 12, 24, . . . to one of these rules A) start at 3 and add 3, B) start at 3 and double, C) start at 3 and add 6, and D) start at 3 and halve).</p>
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#### A2: EXPRESSIONS

Not applicable to grade 5

#### A3: RELATIONS AND FUNCTIONS

##### A3.1: Variation (ratio, proportion, and percentage) - not applicable to grade 5

##### A3.2: Demonstrate an understanding of equivalency

<p><b>A3.2.1_P</b> Create a numerical expression using <math>\times</math> or <math>\div</math> to model a situation (e.g., represent the following in a number sentence - 3 people get on the bus at each of four stops).</p>	<p><b>A3.2.1_M</b> N/A</p>	<p><b>A3.2.1_E</b> N/A</p>
<p><b>A3.2.2_P</b> Find a missing value in a number sentence using addition and subtraction of numbers within 100 (e.g., <math>23 + \_ = 59</math>).</p>	<p><b>A3.2.1_M</b> Find a missing value in a number sentence using multiplication and division within 100 (e.g., <math>7 \times \_ = 35</math>).</p>	<p><b>A3.2.1_E</b> Find a missing value in a number sentence using any one of the four operations (e.g., <math>3 \times \_ = 18</math>).</p>

## GRADE 5. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
<p>A3.2.3_P Represent real-world addition and subtraction problems within 20 using a number sentence with a symbol or blank to represent the missing value (e.g., <i>13 people are on a bus. More people get on. There are now 7 people on the bus. How many people got on the bus? Represent this situation with an addition or a subtraction sentence.</i>)</p>	<p>A3.2.3_M Represent real-world problems involving the multiplication of two whole numbers to 10 and related division facts, using a number sentence with a symbol or blank to represent the missing value (e.g. <i>Paul has three bags of oranges. There are the same number of oranges in each bag. He has 18 oranges altogether. How many oranges are there in each bag? Represent the situation with a multiplication sentence</i>)</p>	<p>A3.2.3_E Represent real-world problems using a number sentence with one of the four operations (e.g., <i>Abu has 5 identical water bottles that weigh a total of 15 pounds. Represent the problem with <math>5 \times \underline{\quad} = 15</math>.</i>)</p>

## GRADE 6. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
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### N: NUMBER KNOWLEDGE

#### NI: WHOLE NUMBERS

##### NI.1: Identify and count in whole numbers, and identify relative magnitude

NI.1.1_P	Count in whole numbers up to any whole number.	NI.1.1_M	N/A	NI.1.1_E	N/A
NI.1.2_P	Read and write any whole number.	NI.1.2_M	N/A	NI.1.2_E	N/A
NI.1.3_P	Compare and order whole numbers up to 100,000.	NI.1.3_M	Compare and order any whole numbers.	NI.1.3_E	N/A
NI.1.4_P	Skip count forwards and backwards by thousands.	NI.1.4_M	N/A	NI.1.4_E	N/A

##### NI.2: Represent whole numbers in equivalent ways

NI.2.1_P	Use place-value concepts for thousands, hundreds, tens, and ones (e.g., <i>compose or decompose a four-digit whole number using a number sentence such as <math>1383 = 1 \text{ thousand } 3 \text{ hundreds, } 8 \text{ tens and } 3 \text{ ones}</math>; <math>1383 = 1,000 + 300 + 80 + 3</math>; determine the value of a digit in the thousands place).</i>	NI.2.1_M	Use place-value concepts beyond the thousands (e.g., <i>compose or decompose a seven-digit whole number using a number sentence such as <math>1,383,547 = 1 \text{ million, } 3 \text{ hundred thousands, } 8 \text{ ten thousands, } 3 \text{ thousands, } 5 \text{ hundreds, four tens and } 7 \text{ ones}</math>; <math>1,383,547 = 1,000,000 + 300,000 + 80,000 + 3000 + 500 + 40 + 7</math>; determine the value of a digit in the millions place).</i>	NI.2.1_E	N/A
NI.2.2_P	Round whole numbers to the nearest hundred.	NI.2.2_M	Round whole numbers to the nearest thousand.	NI.2.2_E	Round whole numbers to any place value beyond the thousands place.

##### NI.3: Solve operations using whole numbers

NI.3.1_P	Add and subtract beyond 1,000 (i.e., where the sum or minuend surpasses 1,000), with and without regrouping, and represent these operations with objects, pictures, or symbols (e.g., <i><math>1457 - 129</math>; use number lines to reason through or solve addition and subtraction problems).</i>	NI.3.1_M	N/A	NI.3.1_E	N/A
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## GRADE 6. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
NI.3.2_P	Multiply, with and without regrouping, and divide, with no remainder, any number by a one-digit number and multiply two, two-digit numbers, with and without regrouping (e.g., $342 \times 4 = \underline{\quad}$ ; $42 \times 34 = \underline{\quad}$ ; $1380 \div 5 = \underline{\quad}$ ).	NI.3.2_M	Multiply any number by a two-digit number, with and without regrouping, and divide any number by a one-digit number, with and without a remainder (e.g., $3427 \times 68$ ; $1380 \div 6 = \underline{\quad}$ ).	NI.3.2_E	Multiply any two numbers, with and without regrouping, and divide any number by a two-digit number, with and without a remainder (e.g., $2342 \times 1478$ ; $3388 \div 15 = \underline{\quad}$ ).
NI.3.3_P	Identify factors of whole numbers within 25 and multiples of whole numbers within 10 (e.g., find all factors of 24; find multiples of 8).	NI.3.3_M	Identify factors of whole numbers within 100 and multiples of whole numbers within 20 (e.g., find all factors of 84; find multiples of 15).	NI.3.3_E	Identify factors of whole numbers beyond 100 and multiples of whole numbers beyond 20 (e.g., find factors of 125 or find multiples of 25).
NI.3.4_P	Perform calculations involving two or more operations, within the limits for partially meets expectations described above, respecting the order of operations (e.g., $1754 + 53 \times 53 = \underline{\quad}$ ; $4 \times 9 \times 8 = \underline{\quad}$ ).	NI.3.4_M	Perform calculations involving two or more operations, within the limits for meets expectations described above, respecting the order of operations (e.g., $6584 + 2187 \times 38 = \underline{\quad}$ ; $675 \div 9 \times 652 = \underline{\quad}$ ).	NI.3.4_E	Perform calculations involving two or more operations, within the limits for exceeds expectations described above, respecting the order of operations (e.g., $(6584 + 2187) \times 318 = \underline{\quad}$ ; $(9675 - 823) \div 19 = \underline{\quad}$ ).
<b>NI.4: Solve real-world problems involving whole numbers</b>					
NI.4.1_P	Solve simple real-world problems involving any <b>one</b> of the four operations, including problems involving measurement and currency units and: * addition and subtraction of whole numbers within 1000 with and without regrouping * multiplications up to $10 \times 10$ and related divisions without remainders.	NI.4.1_M	Solve real-world problems involving combinations of any <b>two or more</b> of the four operations, including problems involving measurement and currency units and: * addition and subtraction of whole numbers beyond 1000 with and without regrouping * multiplications and divisions of any number by a one-digit number with and without regrouping (multiplication) and with and without a remainder (division) * multiplications of two, two-digit numbers.	NI.4.1_E	Solve real-world problems involving combinations of any <b>two or more</b> of the four operations, including problems involving measurement and currency units and: * addition and subtraction of any whole numbers * multiplication of any whole numbers * division of any whole number by a two-digit number with and without a remainder
<b>N2: FRACTIONS</b>					
<b>N2.1: Identify and represent fractions using objects, pictures, and symbols, and identify relative magnitude</b>					
N2.1.1_P	Identify and express proper fractions as equivalent fractions with denominators up to 12 (e.g., express a fraction in simplest form $\frac{6}{9} = \frac{\quad}{13}$ ;	N2.1.1_M	Identify and express proper fractions as equivalent fractions (any denominator) (e.g., $\frac{13}{25} = \frac{26}{50}$ ).	N2.1.1_E	N/A

## GRADE 6. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
<i>2/10 = 1/5; express as a multiple of another 4/5 = 8/5).</i>					
N2.1.2_P	N/A	N2.1.2_M	Identify and express improper fractions as equivalent mixed numbers (or vice versa), with pictures or symbols (e.g., represent 9/6 as 1 3/6 or 1 1/2; ; use two arrays or rectangles and coloring to represent 9/6).	N2.1.2_E	N/A
N2.1.3_P	Compare and order fractions with different but related denominators up to 12 (e.g., 2/3 and 5/6).	N2.1.3_M	Compare and order proper and improper fractions with different, unrelated denominators (e.g., 1/4; 7/10; 5/6).	N2.1.3_E	N/A
N2.1.4_P		N2.1.4_M	Compare and order fractions and mixed numbers (e.g., 9/6, 1 1/3, 5/12, 2 1/2).	N2.1.4_E	N/A
<b>N2.2: Solve operations using fractions</b>					
N2.2.1_P	Add and subtract proper fractions with different but related denominators (e.g., 2/3 + 1/6; 7/8 - 1/4).	N2.2.1_M	Add and subtract improper fractions or mixed numbers with different but related denominators (e.g., 2 2/3 + 1 1/6; 25/4 + 5/12).	N2.2.1_E	Add and subtract improper fractions or mixed numbers with different, unrelated denominators (e.g., 9/4 + 3/9; 3 1/6 - 2/5).
N2.2.2_P	Multiply commonly-used fractions by whole numbers, or divide proper fractions by whole numbers, and represent such operations with objects or pictures (e.g., represent 3/4 x 12 with 3 by 4 grid with 3 of the columns colored in; or represent 3/4 divided by 2 as a 1 x 1 grid with one side divided into four equal parts and three blocks colored in and then other side divided into 2 to produce 8 equal blocks with 6 colored in).	N2.2.2_M	Multiply and divide proper fractions and divide improper fractions by whole numbers, and represent such operations with pictures or symbols (e.g., 2/5 ÷ 3/5; 3/4 x 2/6; 7/5 ÷ 2; represent 3/4 x 1/2 as a rectangle split into four equal parts with three parts shaded and each of the four equal parts split into 2 equal. Note that the smaller shaded sections represent the answer).	N2.2.2_E	Multiply and divide fractions (including proper and improper fractions and mixed numbers) (e.g., 3/4 x 7/6 = __; 2/3 x 3 1/4 = __; 4/5 ÷ 5/3 = __).
<b>N2.3: Solve real-world problems involving fractions</b>					

## GRADE 6. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
<p>N2.3.1_P Solve real-world problems involving addition and subtraction of proper fractions with different but related denominators (e.g., Paola has <math>\frac{2}{5}</math> of a chocolate bar left. Her friend Carola has <math>\frac{3}{10}</math> of the same chocolate bar. Together, they have what fraction of the chocolate bar?; Paola has <math>\frac{2}{3}</math> of a chocolate bar left. If she gives her friend Carola <math>\frac{1}{6}</math> of what remains, what fraction of the chocolate bar will Paola have left?).</p>	<p>N2.3.1_M Solve real-world problems involving addition and subtraction of improper fractions and mixed numbers with different but related denominators (e.g., Maya is cutting some oranges for a picnic. She cuts each orange into 8 equal pieces. She puts 25 pieces of orange onto a large plate and 11 pieces of orange onto a smaller plate. What is the smallest number of whole oranges Maya could have cut?; A tree is now 3 and a half meters tall. When it was planted, it was 1 and one quarter meters tall. By how many meters has the tree grown since it was planted?).</p>	<p>N2.3.1_E Solve real-world problems involving the addition and subtraction of proper and improper fractions and mixed numbers with unrelated denominators (e.g., A carpenter has a piece of wood that measures 15 and <math>\frac{7}{8}</math> ft. She only needs a piece that measures 10 and <math>\frac{5}{12}</math> ft. What is the length of the piece of wood she should cut off the long piece?).</p>
<p>N2.3.2_P Solve real-world problems involving the multiplication and division of a proper fraction and a whole number (e.g., Misha has half a pizza. If she shares it with her brother. What fraction of the original pizza will each receive?).</p>	<p>N2.3.2_M Solve real-world problems involving the multiplication of two proper fractions or the division of an improper fraction or mixed number by a whole number (e.g., Misha has half a pizza. If she shares it equally with her brother, what fraction of the original pizza will each receive?).</p>	<p>N2.3.2_E Solve real-world problems involving the multiplication and division of fractions (including proper and improper fractions and mixed numbers) (e.g., A cake needs 1 and a half cups of flour. How much is needed to make half a cake?; Dean has a piece of wood that is <math>\frac{3}{4}</math> of a foot in length. He needs to cut it into pieces that are <math>\frac{1}{16}</math>th of a foot long. How many pieces can he cut?).</p>
<p><b>N3: DECIMALS</b></p>		
<p><b>N3.1: Identify and represent decimals using objects, pictures, and symbols, and identify relative magnitude</b></p>		
<p>N3.1.1_P Identify and represent quantities using decimal notation (i.e., symbols) up to the tenths place (e.g., identify that 0.8 is 8 tenths).</p>	<p>N3.1.1_M Identify and represent quantities using decimal notation up to the hundredths place (e.g., identify that 0.65 is 65 hundredths).</p>	<p>N3.1.1_E Identify and represent quantities using decimal notation beyond the hundredths place (e.g., identify that 0.655 is 655 thousandths).</p>
<p>N3.1.2_P Compare and order decimal numbers up to the tenths place (e.g., sort the following decimals from high to low: 0.8, 0.3, 0.1).</p>	<p>N3.1.2_M Compare and order decimal numbers up to the hundredths place (e.g., sort the following decimals from high to low: 0.8, 0.33, 0.08, 0.6).</p>	<p>N3.1.2_E Compare and order decimal numbers beyond the hundredths place (e.g., sort the following decimals from low to high: 0.821, 0.33, 0.08, 0.698, 0.7).</p>
<p><b>N3.2: Represent decimals in equivalent ways (including fractions and percentages)</b></p>		
<p>N3.2.1_P Round decimal numbers to the nearest tenths place (e.g., round 3.46 to 3.5).</p>	<p>N3.2.1_M Round decimal numbers to the nearest hundredths place (e.g., round 3.456 to 3.46).</p>	<p>N3.2.1_E Round decimal numbers to any place value beyond the hundredths place (e.g., round 3.45619 to 3.4562).</p>

## GRADE 6. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
N3.2.2_P	Identify and express fractions with denominators of 10 using decimal notation (e.g., $7/10 = 0.7$ ).	N3.2.2_M	Identify and express fractions with denominators of 100 and everyday fractions, using decimal notation, and represent fractions with denominators of 100 as percentages (e.g., $3/4 = 0.75$ ; $72/100 = 0.72 = 72\%$ ).	N3.2.2_E	Identify and express fractions with any denominator using decimal notation and vice versa (e.g., $752/1000 = 0.752$ ; $7/8 = 0.875$ ).
N3.2.3_P	Compare and order decimals and proper fractions with denominators of 10 (e.g., place a list of decimals and fractions on a number line).	N3.2.3_M	Compare and order decimals (to hundredths place) and proper fractions (e.g., place a list of decimals and proper fractions on a number line).	N3.2.3_E	Compare and order fractions, decimals, and percentages (e.g., place these numbers on a number line: 0.4, $1/2$ , 0.50%, $4/5$ , 0.25, $1/3$ , 0.25%).
<b>N3.3: Solve operations using decimals</b>					
N3.3.1_P	Add and subtract decimal numbers up to the tenths place. Create or identify concrete or picture models to represent such additions (e.g., $0.5 + 0.2$ ).	N3.3.1_M	Add and subtract decimal numbers up to the hundredths place. Create or identify concrete or picture models to represent such additions (e.g., $3.41 + 5.3$ ).	N3.3.1_E	Add and subtract any positive decimal numbers.
<b>N3.4: Solve real-world problems involving decimals</b>					
N3.4.1_P	N/A	N3.4.1_M	Solve real-world problems involving the addition and subtraction of decimals to the tenths place (e.g., Diego has 3.2 meters of roof sheeting. If he buys another 1.4 meters, how many meters of roof sheeting will he have altogether? Aminata has 32.5 kg of grout for tiling. If she uses 12.1 kg for a new project, how many kgs of tile grout will she have left?).	N3.4.1_E	Solve real-world problems involving addition and subtraction of decimals beyond the tenths place (e.g., Aria has a height of 1.55 meters. Her mother has a height of 1.63 meters. How much taller than Aria is her mother? Adwoa has 1.64 meters of roof sheeting and another 1.4 meters. How many meters of roof sheeting does she have?).



## GRADE 6. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
<b>M: MEASUREMENT</b>		
<b>MI: LENGTH, WEIGHT, CAPACITY, VOLUME, AREA, AND PERIMETER</b>		
<b>MI.1: Use non-standard and standard units to measure, compare, and order</b>		
<p><b>MI.1.1_P</b> Identify the relationship between the relative size of adjacent units within a standard system of measurement for length and weight (e.g., identify the number of millimeters in a centimeter).</p>	<p><b>MI.1.1_M</b> Make conversions between adjacent units of length and weight within a standard system of measurement (e.g., identify that the 16 centimeter pencil is 160 millimeters long).</p>	<p><b>MI.1.1_E</b> Make conversions between non-adjacent units of length and weight within a standard system of measurement (e.g., convert kilometers to millimeters).</p>
<p><b>MI.1.2_P</b> Identify the relationship between the relative size of adjacent units within a standard system of measurement for capacity/volume (e.g., Identify the number of pints in a quart).</p>	<p><b>MI.1.2_M</b> Make conversions between adjacent units of capacity/volume within a standard system of measurement (e.g., identify that there are four pints in a two-quart container).</p>	<p><b>MI.1.2_E</b> Make conversions between non-adjacent units of capacity/volume within a standard system of measurement (e.g., convert pints to gallons).</p>
<p><b>MI.1.3_P</b> Read scales to the nearest marked increment on a variety of measuring tools involving fractions and decimals to the tenths place, containing both labeled and unlabeled scale increments (e.g., kitchen scale containing increments expressed as fractions).</p>	<p><b>MI.1.3_M</b> Read scales to the nearest marked increment on a variety of measuring tools involving decimals to the hundredths place, containing both labeled and unlabeled scale increments (e.g., read a depth gauge in a dam with scale increments increasing in 25-centimeter intervals and labels expressed as decimal meters e.g., 1.25, 1.5, 1.75, 2.0, when the needle is pointing directly at a marked increment of the scale).</p>	<p><b>MI.1.3_E</b> Read scales on a variety of measuring tools by reading between marked scale increments (interpolating) (e.g., read a kitchen scale marked in grams and kilograms with some unlabeled scale markings and needle pointing between two unlabeled scale markings; measure an angle using a protractor/angle measurer).</p>
<b>MI.2: Solve problems involving measurement</b>		
<p><b>MI.2.1_P</b> Solve problems, including real-world problems, involving the perimeter of a polygon.</p>	<p><b>MI.2.1_M</b> Solve problems, including real-world problems, involving comparing the perimeters of polygons.</p>	<p><b>MI.2.1_E</b> Solve problems, including real-world problems, involving perimeter in which the unknown is a length (e.g., identify the fifth length in a picture of an irregular pentagon with four sides labeled with length and a given perimeter).</p>
<p><b>MI.2.2_P</b> Solve problems, including real-world problems, involving the calculation of the area of a rectangle.</p>	<p><b>MI.2.2_M</b> Solve problems, including real-world problems, involving the area of compound shapes comprised of rectangles using concrete or pictorial representations of units (e.g., grid squares or tiles).</p>	<p><b>MI.2.2_E</b> Solve problems, including real-world problems, involving the calculation of the area of compound shapes comprised of rectangles (e.g., calculate the area of a compound L-shape given a picture with the lengths of all sides provided).</p>

## GRADE 6. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
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### M2: TIME

M2.1: Tell time - subconstruct covered in grades 1-5 and is, therefore, assumed knowledge for grade 6

#### M2.2: Solve problems involving time

M2.2.1_P	Solve problems, including real world problems, involving elapsed time in minutes across hours (e.g., <i>calculate the difference between 3:24 and 5:12 or the difference between 16:35 and 18:22</i> ), including problems involving schedules (i.e., timetables, agendas, itineraries).	M2.2.1_M	Solve problems, including real-world problems, involving elapsed time across AM and PM in countries that teach 12-hour time (e.g., <i>calculate the difference between 10:30am and 3:15pm</i> ).	M2.2.1_E	N/A
M2.2.2_P	Solve problems, including real-world problems, involving the number of days in a week, months in a year, hours in a day, minutes in an hour, and seconds in a minute.	M2.2.2_M	N/A	M2.2.2_E	N/A

### M3: CURRENCY

M3.1: Use different currency units to create amounts - subconstruct fully covered in grades 1-3. Questions involving currency are covered under the relevant real-world problem subconstructs (e.g., N1.4 for whole numbers, etc.)

## G: GEOMETRY

### G1: PROPERTIES OF SHAPES AND FIGURES

#### G1.1: Differentiate shapes and figures by their attributes

G1.1.1_P	Recognize and name types of triangles (e.g., <i>isosceles, scalene, equilateral, and right angle</i> ).	G1.1.1_M	Recognize and name types of quadrilaterals (e.g., <i>parallelogram; trapezium, etc.</i> ).	G1.1.1_E	N/A
G1.1.2_P	Recognize and name three-dimensional figures by their attributes (i.e., <i>faces, edges, vertices</i> ).	G1.1.2_M	Identify parallel and perpendicular sides of shapes.	G1.1.2_E	Use the defining attributes (e.g., <i>type of angle, parallel and perpendicular lines</i> ) of complex two-dimensional shapes to classify them.
G1.1.3_P	Recognize types of angles by their magnitude (e.g., <i>right, straight, acute, obtuse</i> ).	G1.1.3_M	N/A	G1.1.3_E	Estimate the size of angles by comparing to reference/benchmark angles (e.g., <i>estimate the size of a given angle with reference to the fact that it is smaller than a right angle and larger than 45°</i> ).

## GRADE 6. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
G1.1.4_P N/A	G1.1.4_M N/A	G1.1.4_E N/A
<b>G2: SPATIAL VISUALIZATIONS</b>		
<b>G2.1: Compose and decompose shapes and figures</b>		
<p style="text-align: center;">G2.1.1_P</p> <p>Identify the net of a cube (e.g., <i>fold mentally to answer the question, which of these is the net of a cube?; identify opposite faces on a net</i>).</p>	<p style="text-align: center;">G2.1.1_M</p> <p>Identify front, top, and side views of a familiar three-dimensional figure (i.e. prism, cylinder, cone or pyramid) (e.g., <i>identify that the top view of an upright cylinder is a circle</i>).</p>	<p style="text-align: center;">G2.1.1_E</p> <p>Identify alternate views of the same compound or irregular three-dimensional shape, such as its front, top and side view, a rotated view, or a view of a hidden side (e.g., <i>label images (i), (ii), and (iii) as the front, top and side view of the three-dimensional shape</i>).</p>
<b>G3: POSITION AND DIRECTION</b>		
<b>G3.1: Describe the position and direction of objects in space</b>		
<p style="text-align: center;">G3.1.1_P</p> <p>Use a grid map with compass directions when the grid dimensions are given in terms of the real-world distance (e.g., <i>Which of these is closest to the distance between the park and Juan's house? A. 100 meters B. 150 meters C. 200 meters D. 250 meters</i>).</p>	<p style="text-align: center;">G3.1.1_M</p> <p>Locate and plot points on a plane in the first quadrant of a Cartesian coordinate system.</p>	<p style="text-align: center;">G3.1.1_E</p> <p>Draw shapes in the first quadrant of a Cartesian coordinate system, and find missing points (e.g., <i>if (1,1), (1,3) and (1,2) are three corners of a rectangle, identify the fourth corner?</i>).</p>
<p style="text-align: center;">G3.1.2_P N/A</p>	<p style="text-align: center;">G3.1.2_M</p> <p style="text-align: center;">N/A</p>	<p style="text-align: center;">G3.1.2_E</p> <p>Identify horizontal and/or vertical distances between two points in the first quadrant of the Cartesian coordinate system (e.g., <i>using the Cartesian coordinate system, identify how many horizontal and vertical units is (1,1) from (3,4)</i>).</p>

## **S: STATISTICS AND PROBABILITY**

## GRADE 6. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
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### S1: DATA MANAGEMENT

#### S1.1: Retrieve and interpret data presented in displays

<p>S1.1.1_P Organize data and construct a tally chart, bar graph, or pictograph that arranges data into categories and uses a single- or multi-unit scale.</p>	<p>S1.1.1_M Retrieve information from data displays that arrange data into categories and sub-categories with a single- or multi-unit scale <i>(e.g., How many girls liked green in this bar chart?).</i></p>	<p>S1.1.1_E Retrieve categorical data from pie charts and Venn diagrams and bivariate data from line graphs and dot plots.</p>
<p>S1.1.2_P Compare by calculating differences between categories in a tally chart, bar graph, or pictograph with a multi-unit scale.</p>	<p>S1.1.2_M N/A</p>	<p>S1.1.2_E N/A</p>

### S2: CHANCE AND PROBABILITY

#### S2.1: Describe the likelihood of events in different ways

<p>S2.1.1_P Identify the likelihood of an event happening as likely or unlikely <i>(e.g., There are 9 blue, 1 red, 1 green, 1 yellow marbles in a bag. Which color is likely to be selected?).</i></p>	<p>S2.1.1_M Compare the likelihoods of two or more events happening, using descriptive words <i>(e.g., Given a picture of a spinner with five equal colored sections - red, blue, yellow, green and purple, the question is: 'If the spinner is spun two times, what is the chance that it will land on blue both times?,' and the possible answers are A) impossible, B) unlikely, C) likely, and D) certain).</i></p>	<p>S2.1.1_E Calculate the probability of a simple event happening, with the answer expressed as a fraction, decimal, or percentage <i>(e.g., What is the probability of rolling a 6 on a standard number dice?).</i></p>
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### A: ALGEBRA

#### A1: PATTERNS

##### A1.1: Recognize, describe, extend, and generate patterns

## GRADE 6. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
<p><b>A1.1.1_P</b> Describe numerical patterns that increase or decrease by a constant multiplier, and use this to identify a missing element or extend the pattern (e.g., describe that the pattern 2, 4, 8, 16 starts at 2 and doubles or that the pattern 20, 10, 5, 2.5 starts at 20 and halves; identify the missing element in the pattern 3, 6, __, 24, 48; write the next two numbers in the pattern 80, 40, 20, 10).</p>	<p><b>A1.1.1_M</b> Generate a pattern from a given rule, or match a pattern to a given rule using any operation (e.g., start at 5 and increase by 3 to generate 5, 8, 11, 14, 17 . . .; match the pattern 3, 6, 12, 24, . . . to one of these rules A) start at 3 and add 3, B) start at 3 and double, C) start at 3 and add 6, and D) start at 3 and halve).</p>	<p><b>A1.1.1_E</b> Recognize and extend non-linear patterns, including squaring patterns, which may be supported by a visual representation (e.g., recognize that 1, 3, 6, 10 increases by 2, then 3, then 4, when accompanied by dots or points arranged into triangles; extend the pattern 2, 4, 16, 25 ).</p>

### A2: EXPRESSIONS

Not applicable to grade 6

### A3: RELATIONS AND FUNCTIONS

#### A3.1: Solve problems involving variation (ratio, proportion, and percentage)

<p><b>A3.1.1_P</b> Represent real-world situations with a ratio (e.g., There are 15 boys and 20 girls in the class. What is the ratio of boys to girls?)</p>	<p><b>A3.1.1_M</b> Reason proportionally to answer real-world problems involving a unit ratio expressed informally (e.g., If Tulika needs 3 eggs for 1 cake, how many eggs does Tulika need for 5 cakes?).</p>	<p><b>A3.1.1_E</b> Reason proportionally to answer real-world problems involving a ratio (e.g., Purple paint is made from 2 parts blue paint to 3 parts red paint. I have 10 parts of blue paint. How many parts of red paint do I need?; or the ratio of teachers to students on a school trip must be 1:9. How many teachers are needed if there are 36 students?).</p>
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#### A3.2: Demonstrate an understanding of equivalency

<p><b>A3.2.1_P</b> Find a missing value in a number sentence using addition and subtraction of numbers within 100 (e.g., <math>23 + \underline{\quad} = 59</math>).</p>	<p><b>A3.2.1_M</b> Find a missing value in a number sentence using any one of the four operations (e.g., <math>3 \times \underline{\quad} = 18</math>).</p>	<p><b>A3.2.1_E</b> Find a missing value in a two-step number sentence using the four operations (e.g. <math>3 \times \underline{\quad} + 4 = 22</math>).</p>
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## GRADE 6. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
<p>A3.2.2_P    N/A</p>	<p>A3.2.2_M    Represent real-world problems using a number sentence with one of the four operations (e.g., <i>Abu has 5 identical water bottles that weigh a total of 15 pounds. Represent the problem as <math>5 \times \underline{\quad} = 15</math>.</i>)</p>	<p>A3.2.2_E    Represent real-world problems using a two-step number sentence with any of the four operations (e.g., <i>Some people got on a bus, doubling the number of passengers. At the next stop, 8 people got off, leaving 16 people on the bus. Represent the problem as <math>2x - 8 = 16</math>.</i>)</p>

## GRADE 7. GLOBAL MINIMUM DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
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### N: NUMBER KNOWLEDGE

NI: WHOLE NUMBERS - in grades 7 and 8, this construct is covered in N4: INTEGERS

NI.1: Identify and count in whole numbers and identify relative magnitude - subconstruct fully covered in grades 1-6 and is, therefore, assumed knowledge for grade 7

NI.2: Represent whole numbers in equivalent ways - subconstruct fully covered in grades 1-6 and is, therefore, assumed knowledge for grade 7

NI.3: Solve operations using whole numbers - see N4.2

NI.4: Solve real-world problems involving whole numbers - see N4.3

### N2: FRACTIONS

N2.1: Identify and represent fractions using objects, pictures, and symbols, and identify relative magnitude

N2.1.1_P	Identify and express proper fractions as equivalent fractions (any denominator) (e.g., $13/25 = 26/50$ ).	N2.1.1_M	N/A	N2.1.1_E	N/A
N2.1.2_P	Identify and express improper fractions as equivalent mixed numbers (or vice versa), with pictures or symbols (e.g., represent $9/6$ as $1\ 3/6$ or $1\ 1/2$ ; ; use two arrays or rectangles and coloring to represent $9/6$ ).	N2.1.2_M	N/A	N2.1.2_E	N/A
N2.1.3_P	Compare and order proper and improper fractions with different, unrelated denominators (e.g., $1/4$ ; $7/10$ ; $5/6$ ).	N2.1.3_M	Compare and order positive and negative fractions (proper and improper) and mixed numbers (e.g., $-2/3$ , $1/3$ , $5/6$ , $-1\ 1/2$ , $5/9$ ).	N2.1.3_E	N/A
N2.1.4_P	Compare and order fractions and mixed numbers (e.g., $9/6$ , $1\ 1/3$ , $5/12$ , $2\ 1/2$ ).	N2.1.4_M	N/A	N2.1.4_E	N/A

N2.2: Solve operations using fractions

N2.2.1_P	Add and subtract improper fractions or mixed numbers with different but related denominators (e.g., $2\ 2/3 + 1\ 1/6$ ; $25/4 + 5/12$ ).	N2.2.1_M	Add and subtract improper fractions or mixed numbers with different, unrelated denominators (e.g., $9/4 + 3/9$ ; $3\ 1/6 - 2/5$ ).	N2.2.1_E	N/A
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## GRADE 7. GLOBAL MINIMUM DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
N2.2.2_P	Multiply and divide proper fractions and divide improper fractions by whole numbers, and represent such operations with pictures or symbols (e.g., $2/5 \div 3/5$ ; $3/4 \times 2/6$ ; $7/5 \div 2$ ; represent $3/4 \times 1/2$ as a rectangle split into four equal parts with three parts shaded and each of the four equal parts split into 2 equal. Note that the smaller shaded sections represent the answer).	N2.2.2_M	Multiply and divide fractions (including proper and improper fractions and mixed numbers) (e.g., $3/4 \times 7/6 = \underline{\quad}$ ; $2/3 \times 3 \ 1/4 = \underline{\quad}$ ; $4/5 \div 5/3 = \underline{\quad}$ ).	N2.2.2_E	N/A
<b>N2.3: Solve real-world problems involving fractions</b>					
N2.3.1_P	Solve real-world problems involving addition and subtraction of improper fractions and mixed numbers with different but related denominators (e.g., <i>Maya is cutting some oranges for a picnic. She cuts each orange into 8 equal pieces. She puts 25 pieces of orange onto a large plate and 11 pieces of orange onto a smaller plate. What is the smallest number of whole oranges Maya could have cut?</i> ; <i>A tree is now 3 and a half meters tall. When it was planted, it was 1 and one quarter meters tall. By how many meters has the tree grown since it was planted?</i> ).	N2.3.1_M	Solve real-world problems involving the addition and subtraction of proper and improper fractions and mixed numbers with unrelated denominators (e.g., <i>A carpenter has a piece of wood that measures 15 and 7/8 ft. She only needs a piece that measures 10 and 5/12 ft. What is the length of the piece of wood she should cut off the long piece?</i> ).	N2.3.1_E	N/A
N2.3.2_P	Solve real-world problems involving the multiplication of two proper fractions or the division of an improper fraction or mixed number by a whole number (e.g., <i>Misha has half a pizza. If she shares it equally with her brother, what fraction of the original pizza will each receive?</i> ).	N2.3.2_M	Solve real-world problems involving the multiplication and division of fractions (including proper and improper fractions and mixed numbers) (e.g., <i>A cake needs 1 and a half cups of flour. How much is needed to make half a cake?</i> ; <i>Dean has a piece of wood that is 3/4 of a foot in length. He needs to cut it into pieces that are 1/6th of a foot long. How many pieces can he cut?</i> ).	N2.3.2_E	N/A



## GRADE 7. GLOBAL MINIMUM DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
<b>N3: DECIMALS</b>					
<b>N3.1: Identify and represent decimals using objects, pictures, and symbols, and identify relative magnitude</b>					
N3.1.1_P	Identify and represent quantities using decimal notation up to the hundredths place (e.g., identify that 0.65 is 65 hundredths).	N3.1.1_M	Identify and represent quantities using decimal notation beyond the hundredths place (e.g., identify that 0.655 is 655 thousandths).	N3.1.1_E	N/A
N3.1.2_P	Compare and order decimal numbers up to the hundredths place (e.g., sort the following decimals from high to low: 0.8, 0.33, 0.08, 0.6).	N3.1.2_M	Compare and order decimal numbers beyond the hundredths place (e.g., sort the following decimals from low to high: 0.821, 0.33, 0.08, 0.698, 0.7).	N3.1.2_E	N/A
N3.1.3_P	N/A	N3.1.3_M	Compare and order positive and negative decimal numbers, including those beyond the thousandths place (e.g., compare +0.821, -0.33, -0.08, +0.698, +0.7).	N3.1.3_E	N/A
<b>N3.2: Represent decimals in equivalent ways (including fractions and percentages)</b>					
N3.2.1_P	Round decimal numbers to the nearest hundredths place (e.g., round 3.456 to 3.46).	N3.2.1_M	Round decimal numbers to any place value beyond the hundredths place (e.g., round 3.45619 to 3.4562).	N3.2.1_E	N/A
N3.2.2_P	Identify and express fractions with denominators of 100 and everyday fractions, using decimal notation, and represent fractions with denominators of 100 as percentages (e.g., $3/4 = 0.75$ ; $72/100 = 0.72 = 72\%$ ).	N3.2.2_M	Identify and express fractions with any denominator using decimal notation and vice versa (e.g., $752/1000 = 0.752$ ; $7/8 = 0.875$ ).	N3.2.2_E	N/A
N3.2.3_P	Compare and order decimals (to hundredths place) and proper fractions (e.g., place a list of decimals and proper fractions on a number line).	N3.2.3_M	Compare and order fractions, decimals, and percentages (e.g., place these numbers on a number line:	N3.2.3_E	Compare and order positive and negative decimals and fractions (e.g., place these numbers on a number line from -1 to +1: -0.4, +1/2, -4/5, 0.25, -1/3, 3/4).

## GRADE 7. GLOBAL MINIMUM DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency		
		<i>0.4, 1/2, 0.50%, 4/5, 0.25, 1/3, 0.25%.</i>			
N3.2.4_P	N/A	N3.2.4_M	Identify and express percentages as fractions with denominators of 10 or 100 or as decimals and vice versa (e.g., $80\% = 80/100$ or $8/10$ ; $75\% = 0.75$ ).	N3.2.4_E	Identify and express percentages less than 1% and greater than 100% as fractions or mixed numbers and vice versa (e.g., $124\% = 1\ 24/100$ ; $0.2\% = 2/1000$ ).
<b>N3.3: Solve operations using decimals</b>					
N3.3.1_P	Add and subtract decimal numbers up to the hundredths place. Create or identify concrete or picture models to represent such additions (e.g., $3.41 + 5.3$ ).	N3.3.1_M	Add and subtract any positive and negative decimal numbers.	N3.3.1_E	N/A
N3.3.2_P	N/A	N3.3.2_M	Multiply and divide a decimal number by a whole number.	N3.3.2_E	Multiply and divide two decimal numbers and divide a whole number by a decimal.
<b>N3.4: Solve real-world problems involving decimals</b>					
N3.4.1_P	Solve real-world problems involving the addition and subtraction of decimals to the tenths place (e.g., <i>Diego has 3.2 meters of roof sheeting. If he buys another 1.4 meters, how many meters of roof sheeting will he have altogether? Aminata has 32.5 kg of grout for tiling. If she uses 12.1 kg for a new project, how many kgs of tile grout will she have left?</i> ).	N3.4.1_M	Solve real-world problems involving addition and subtraction of decimals beyond the tenths place (e.g., <i>Aria has a height of 1.55 meters. Her mother has a height of 1.63 meters. How much taller than Aria is her mother? Adwoa has 1.64 meters of roof sheeting and another 1.4 meters. How many meters of roof sheeting does she have?</i> ).	N3.4.1_E	N/A

## GRADE 7. GLOBAL MINIMUM DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
N3.4.2_P	N/A	N3.4.2_M Solve real-world problems involving the multiplication or division of a decimal by a whole number (e.g., <i>Misha buys 4 bags of sugar. Each bag holds 1.5 kg. How many kilos of sugar did he buy? Saira has 2.4 kg of sugar. She wants to separate the sugar into three bags of equal size. How many kgs should she put in each bag?</i> ).	N3.4.2_E  Solve real-world problems involving the multiplication or division of two decimal numbers (e.g., <i>Pascal has seven .75 liter containers of olive oil. He sells half of them. How many liters of olive oil did he sell? Or Sheila buys a 4.5 liter barrel of olive oil. She sells them in 0.75 liter containers. How many containers can she make with the 4.5 liter barrel?</i> ).

### N4: INTEGERS

#### N4.1: Identify and represent integers using objects, pictures, or symbols, and identify relative magnitude

N4.1.1_P	N/A	N4.1.1_M Compare and order integers (e.g., <i>order the following from smallest to largest: -4, 6, -9, 2</i> ).	N4.1.1_E	N/A
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#### N4.2: Solve operations using integers

N4.2.1_P	Multiply any positive integer by a two-digit number, with and without regrouping, and divide any positive integer by a one-digit number, with and without a remainder (e.g., $3427 \times 68$ ; $1380 \div 6 = \underline{\quad}$ ).	N4.2.1_M	Multiply any two positive integers, with and without regrouping, and divide any integer by a two-digit number, with and without a remainder (e.g., $2342 \times 1478$ ; $3388 \div 15 = \underline{\quad}$ ).	N4.2.1_E	N/A
N4.2.2_P	Perform calculations involving two or more operations with positive integers, within the limits for partially meets expectations described above, respecting the order of operations (e.g., $6584 + 2187 \times 38 = \underline{\quad}$ ; $675 \div 9 \times 652 = \underline{\quad}$ ).	N4.2.2_M	Perform calculations involving two or more operations with positive integers, within the limits for meets expectations described above, respecting the order of operations (e.g., $(6584 + 2187) \times 318 = \underline{\quad}$ ; $(9675 - 823) \div 19 = \underline{\quad}$ ).	N4.2.2_E	N/A

## GRADE 7. GLOBAL MINIMUM DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
N4.2.3_P	Identify factors of whole numbers within 100 and multiples of whole numbers within 20 (e.g., find all factors of 84; find multiples of 15).	N4.2.3_M	Identify factors of whole numbers beyond 100 and multiples of whole numbers beyond 20 (e.g., find factors of 125 or find multiples of 25).	N4.2.3_E	Identify common factors and common multiples of two numbers (e.g., find the lowest common multiple and the greatest common factor of 12 and 16).
N4.2.4_P	N/A	N4.2.4_M	Perform calculations involving operations with negative integers.	N4.2.4_E	N/A
<b>N4.3: Solve real-world problems involving integers</b>					
N4.3.1_P	N/A	N4.3.1_M	Solve real-world problems involving combinations of any two or more of the four operations, including problems involving measurement and currency units and: * addition and subtraction of any integers * multiplication of any positive integers * division of any positive integers by a positive two-digit number with or without a remainder (e.g., The temperature last night was -3 C. This morning it was +2C. What was the change in temperature between last night and this morning?).	N4.3.1_E	Solve real-world problems involving the multiplication or division of two integers, including at least one negative integer (e.g., it is -8 degrees Celsius on Tuesday. On Wednesday, it is three times colder. What is the temperature on Wednesday?).

## GRADE 7. GLOBAL MINIMUM DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
<b>N5: EXPONENTS AND ROOTS</b>					
<b>N5.1: Identify and represent exponents and roots using objects, pictures, or symbols, and identify relative magnitude</b>					
N5.1.1_P	N/A	N5.1.1_M	Identify the square, cube, square root, and cube root of whole numbers using pictures and symbols, and represent a square or cube number using exponential notation (e.g., use square arrays or grids to represent square numbers or identify the square of a number; identify the square of 8 or the square root of 81; represent 64 as $8^2$ ).	N5.1.1_E	N/A
N5.1.2_P	N/A	N5.1.2_M	N/A	N5.1.2_E	Identify and represent very large whole numbers using scientific notation and positive exponents (e.g., $600 = 6 \times 10^2$ ).
N5.1.3_P	N/A	N5.1.3_M	N/A	N5.1.3_E	Compare and order large numbers expressed in scientific notation (e.g., $3.1 \times 10^5$ , $9.2 \times 10^5$ , $2.7 \times 10^3$ ; $6.1 \times 10^2$ ).

### M: MEASUREMENT

#### MI: LENGTH, WEIGHT, CAPACITY, VOLUME, AREA, AND PERIMETER

##### MI.1: Use non-standard and standard units to measure, compare, and order

MI.1.1_P	Make conversions between adjacent units of length and weight within a standard system of measurement (e.g., identify that the 16 centimeter pencil is 160 millimeters long).	MI.1.1_M	Make conversions between non-adjacent units of length and weight within a standard system of measurement (e.g., convert kilometers to millimeters).	MI.1.1_E	Make conversions of units of length and weight between different systems of measurement where the conversion factor is provided (e.g., convert 12 cm to inches given 1 inch is 2.54cm, convert pounds to kilograms given 1 pound is 0.45 kg).
MI.1.2_P	Make conversions between adjacent units of capacity/volume within a standard system of measurement (e.g., identify that there are four pints in a two-quart container).	MI.1.2_M	Make conversions between non-adjacent units of capacity/volume within a standard system of measurement (e.g., convert pints to gallons).	MI.1.2_E	Make conversions of units of capacity/volume between different systems of measurement where the conversion factor is provided (e.g., convert 750 milliliters to pints given 1 pint is 473 mL).

## GRADE 7. GLOBAL MINIMUM DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
MI.1.3_P	Read scales to the nearest marked increment on a variety of measuring tools involving decimals to the hundredths place, containing both labeled and unlabeled scale increments <i>(e.g., read a depth gauge in a dam with scale increments increasing in 25-centimeter intervals and labels expressed as decimal meters e.g., 1.25, 1.5, 1.75, 2.0, when the needle is pointing directly at a marked increment of the scale).</i>	MI.1.3_M	Read scales on a variety of measuring tools by reading between marked scale increments (interpolating) <i>(e.g., read a kitchen scale marked in grams and kilograms with some unlabeled scale markings and needle pointing between two unlabeled scale markings; measure an angle using a protractor/angle measurer).</i>	MI.1.3_E	N/A
<b>MI.2: Solve problems involving measurement</b>					
MI.2.1_P	Solve problems, including real-world problems, involving comparing the perimeters of polygons.	MI.2.1_M	Solve problems, including real-world problems, involving perimeter in which a length is unknown <i>(e.g., identify the fifth length in a picture of an irregular pentagon with four sides labeled with length and a given perimeter).</i>	MI.2.1_E	N/A
MI.2.2_P	Solve problems, including real-world problems, involving the area of compound shapes comprised of rectangles using concrete or pictorial representations of units <i>(e.g., grid squares or tiles).</i>	MI.2.2_M	Solve problems, including real-world problems, involving the calculation of the area of compound shapes comprised of rectangles <i>(e.g., calculate the area of a compound L-shape given a picture with the lengths of all sides provided).</i>	MI.2.2_E	Solve problems, including real-world problems, involving the calculation of the area of a triangle <i>(e.g., work out the area of a triangle with base length and height given).</i>
MI.2.3_P	N/A	MI.2.3_M	N/A	MI.2.3_E	Solve problems, including real-world problems, involving the calculation of the area of compound shapes comprising rectangles and triangles <i>(e.g., calculate the area of a composite shape given a picture of the shape made up of a rectangle connected to a right-angled triangle with the lengths of all sides provided).</i>

## GRADE 7. GLOBAL MINIMUM DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
MI.2.4_P	N/A	MI.2.4_M	N/A	MI.2.4_E	Solve problems, including real-world problems, involving the calculation of the volume of a rectangular prism (e.g., calculate the volume in cubic centimeters of a box with a length of 10 cm, width of 10 cm and height of 15 cm).

### M2: TIME

M2.1: Tell time - subconstruct fully covered in grades 1-6 and is, therefore, assumed knowledge for grade 7

#### M2.2: Solve problems involving time

M2.2.1_P	Solve problems, including real-world problems, involving elapsed time across AM and PM in countries that teach 12-hour time (e.g., calculate the difference between 10:30am and 3:15pm).	M2.2.1_M	Solve problems, including real-world problems, involving conversion between 12-hour and 24-hour time (e.g., A ferry departs at 1630 hours. It takes 2 hours and 15 minutes to reach its destination. At what time does the ferry arrive at its destination? Give your answer in am/pm time).	M2.2.1_E	Solve problems, including real-world problems, involving time zones (e.g., When it is 4pm on Tuesday in New York, it is 6 am on Wednesday in Sydney. When it is 11 am on Thursday in Sydney, what time and day is it in New York?).
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### M3: CURRENCY

M3.1: Use different currency units to create amounts - subconstruct fully covered in grades 1-3. Questions involving currency are covered under the relevant real-world problem subconstructs (e.g.,N4.3 for integers, etc.)

## G: GEOMETRY

### G1: PROPERTIES OF SHAPES AND FIGURES

#### G1.1: Differentiate shapes and figures by their attributes

G1.1.1_P	Recognize and name types of quadrilaterals (i.e., parallelogram; trapezium, etc.).	G1.1.1_M	N/A	G1.1.1_E	N/A
G1.1.2_P	Identify parallel and perpendicular sides of shapes.	G1.1.2_M	Use the defining attributes (i.e., type of angle, parallel and perpendicular lines) of complex two-dimensional shapes to classify them.	G1.1.2_E	Recognize and name parts of the circle (i.e., radius, diameter, circumference) and identify the relationship between the radius and diameter.

## GRADE 7. GLOBAL MINIMUM DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency		
G1.I.3_P	N/A	G1.I.3_M	Estimate the size of angles by comparing to reference/benchmark angles (e.g., estimate the size of a given angle with reference to the fact that it is smaller than a right angle and larger than 45°).	G1.I.3_E	Know the angle sum of a triangle (e.g., determine the missing angle of a triangle where two angles are given).
G1.I.4_P	N/A	G1.I.4_M	Recognize single-step two-dimensional shape transformations expressed quantitatively (i.e., rotation by a given fraction of a turn, reflection along a given mirror line, or enlargement by a given scale factor).	G1.I.4_E	Describe and implement two-dimensional shape transformations (i.e., reflection, rotation, translation, enlargement/reduction).

### G2: SPATIAL VISUALIZATIONS

#### G2.I: Compose and decompose shapes and figures

G2.I.1_P	Identify front, top, and side views of a familiar three-dimensional figure (i.e. prism, cylinder, cone or pyramid) (e.g., identify that the top view of an upright cylinder is a circle).	G2.I.1_M	Identify alternate views of the same compound or irregular three-dimensional shape, such as its front, top and side view, a rotated view, or a view of a hidden side (e.g., label images (i), (ii), and (iii) as the front, top and side view of the three-dimensional shape).	G2.I.1_E	Identify the net of a familiar three-dimensional figure (i.e. prism, cylinder, cone, or pyramid) (e.g., fold or unfold mentally to answer the question, "What figure does this make when folded?"; "What figure does this make when unfolded?").
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### G3: POSITION AND DIRECTION

#### G3.I: Describe the position and direction of objects in space

G3.I.1_P	Locate and plot points on a plane in the first quadrant of a Cartesian coordinate system.	G3.I.1_M	Draw shapes in the first quadrant of a Cartesian coordinate system, and find missing points (e.g., if (1,1),	G3.I.1_E	Locate and plot points on a plane in all four quadrants of a Cartesian coordinate system.
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## GRADE 7. GLOBAL MINIMUM DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency	
G3.1.2_P	N/A	G3.1.2_M	G3.1.2_E	N/A
		<p><i>(1,3) and (1,2) are three corners of a rectangle, identify the fourth corner?</i></p> <p>Identify horizontal and/or vertical distances between two points in the first quadrant of the Cartesian coordinate system <i>(e.g., using the Cartesian coordinate system, identify how many horizontal and vertical units is (1,1) from (3,4)).</i></p>		

### S: STATISTICS AND PROBABILITY

#### SI: DATA MANAGEMENT

##### SI.1: Retrieve and interpret data presented in displays

SI.1.1\_P

Retrieve information from data displays that arrange data into categories and sub-categories with a single- or multi-unit scale *(e.g., How many girls liked green in this bar chart?)*.

SI.1.1\_M

Retrieve categorical data from pie charts and Venn diagrams and bivariate data from line graphs and dot plots.

SI.1.1\_E

Organize data and construct pie charts and Venn diagrams (categorical data), and line graphs and dot plots (bivariate data) when some support is provided *(e.g., construct a line graph when given labeled horizontal and/or vertical axes, or match a table to the correct pie chart given a range of pie chart options)*.

##### SI.2: Calculate and interpret central tendency

## GRADE 7. GLOBAL MINIMUM DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency		
S1.2.1_P	Calculate the range for a set of data.	S1.2.1_M	Solve problems, including real-world problems, involving calculation of the mean, median, or mode of a set of data.	S1.2.1_E	Describe the effect of adding or removing a specific data value on the mean, median, or mode of a set of data (e.g., <i>What would be the effect of removing a score of 20 from the scores 20, 80, 70 and 75 on the mean? and the possible answers are: a) it would increase; b) it would decrease; c) it would stay the same. The same question can be asked about the effect on the median and the mode. Another example is Juanita plays hockey and aims to achieve a mean of 3 goals per game by the end of the season. Her goals for the first four games are shown: 2, 4, 1, 3. She has one more game to play this season. How many goals must she score in this game to achieve her aim?</i> ).
S1.2.2_P	N/A	S1.2.2_M	Compare key features of the distribution of two different but related sets of data (e.g., <i>compare the heights of 10 Grade 4 students to the heights of 10 Grade 7 students with reference to minimum value, maximum value, and spread of the data</i> ).	S1.2.2_E	Compare the distribution of sub-categories within a set of data (e.g., <i>compare temperatures in a 24-hour period split into day temperatures and night temperatures</i> ).

### S2: CHANCE AND PROBABILITY

#### S2.1: Describe the likelihood of events in different ways

S2.1.1_P	Compare the likelihoods of two or more events happening, using descriptive words (e.g., <i>Given a picture of a spinner with five equal colored sections - red, blue, yellow, green and purple, the question is: 'If the spinner is spun two times, what is the chance that it will land on blue both times?,' and the possible answers are A) impossible, B) unlikely, C) likely, and D) certain</i> ).	S2.1.1_M	Calculate the probability of a simple event happening, with the answer expressed as a fraction, decimal, or percentage, and place probability values or events on a continuum from 0 (impossible) to 1 (certain), with 0.5 meaning equal chance of occurring or not occurring. (e.g., <i>What is the</i>	S2.1.1_E	Find the expected number of occurrences of a specific independent outcome when a probability experiment is repeated many times (e.g., <i>calculate the expected number of heads with 50 flips of a fair coin</i> ).
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## GRADE 7. GLOBAL MINIMUM DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
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*probability of rolling a 6 on a standard number dice?).*

### A: ALGEBRA

#### A1: PATTERNS

##### A1.1: Recognize, describe, extend, and generate patterns

A1.1.1_P	Generate a pattern from a given rule, or match a pattern to a given rule using any operation (e.g., start at 5 and increase by 3 to generate 5, 8, 11, 14, 17 . . . ; match the pattern 3, 6, 12, 24, . . . to one of these rules A) start at 3 and add 3, B) start at 3 and double, C) start at 3 and add 6, and D) start at 3 and halve).	A1.1.1_M	Recognize and extend non-linear patterns, including squaring patterns, which may be supported by a visual representation (e.g., recognize that 1, 3, 6, 10 increases by 2, then 3, then 4, when accompanied by dots or points arranged into triangles; extend the pattern 2, 4, 16, 25 ).	A1.1.1_E	Generate a non-linear pattern from a given rule using any operation (e.g., start at 1 and then increase by 1, 2, 3, 4 . . . to generate 1, 2, 4, 7, 11 or extend to 16, 22, 29).
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#### A2: EXPRESSIONS

##### A2.1: Evaluate, model, and compute with expressions

A2.1.1_P	N/A	A2.1.1_M	Use linear expressions to represent problem situations with a single variable (e.g., The cost of buying cinema tickets online is £12 per ticket plus a £2 booking fee. Write this as an expression where $x$ is the number of tickets purchased).	A2.1.1_E	Use expressions to represent problem situations with multiple variables (e.g., Akeelah bought 4 blouses for $x$ dollars and a wristwatch for $y$ dollars. Represent this as an expression).
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## GRADE 7. GLOBAL MINIMUM DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency		
A2.1.2_P	N/A	A2.1.2_M	Add and subtract linear expressions (e.g., $(3x + 4y) - (2x + 5y)$ ).	A2.1.2_E	Multiply and divide linear monomials, and simplify linear expressions by using the distributive property (e.g., multiply $(3x)(5y)$ ; simplify $2x(3x + 4)$ ).
<b>A3: RELATIONS AND FUNCTIONS</b>					
<b>A3.1: Solve problems involving variation (ratio, proportion, and percentage)</b>					
A3.1.1_P	Reason proportionally to answer real-world problems involving a unit ratio expressed informally (e.g., <i>If Tulika needs 3 eggs for 1 cake, how many eggs does Tulika need for 5 cakes?</i> ).	A3.1.1_M	Reason proportionally to answer real-world problems involving a ratio (e.g., <i>Purple paint is made from 2 parts blue paint to 3 parts red paint. I have 10 parts of blue paint. How many parts of red paint do I need?; or the ratio of teachers to students on a school trip must be 1:9. How many teachers are needed if there are 36 students?</i> ).	A3.1.1_E	Solve proportions written as two equal ratios (e.g., solve $2/3 = 10/x$ ).
A3.1.2_P	N/A	A3.1.2_M	Solve problems, including real-world problems, involving finding the percentages of a known quantity (e.g., <i>20% of 70 = ___; A stadium holds 3200 people. If the stadium is 80% full, how many people are in the stadium?</i> ).	A3.1.2_E	Solve problems, including real-world problems, involving percent increase or decrease (e.g., <i>A shirt that normally costs 25 Euros is on sale for 10% off. How much does it cost now?; A shirt cost 25 Euros in November and then 20 Euros in December. What is the percent decrease in cost?</i> ).
<b>A3.2: Demonstrate an understanding of equivalency - subconstruct fully covered in grades 1-6 and is assumed knowledge for grade 7</b>					
<b>A3.3: Solve equations and inequalities</b>					

## GRADE 7. GLOBAL MINIMUM DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency		
A3.3.1_P	Represent and solve problems, including real-world problems, using an equation with one of the four operations (e.g., solve $3x = 18$ ; Abu has 5 water bottles that weigh a total of 15 pounds. How much does each water bottle weigh? Represent the problem using an equation.).	A3.3.1_M	Represent and solve problems, including real-world problems, using a two-step equation with any of the four operations (e.g., solve $3x + 4 = 22$ ; Some people got on a bus, doubling the number of passengers. At the next stop, 8 people got off, leaving 16 people on the bus. Represent the situation as an equation, and solve to find the number of people on the bus originally).	A3.3.1_E	Represent and solve problems, including real-world problems, using more than two steps, including those that involve the distributive property, combining like terms, etc. (e.g., solve $3x + 4(x + 2) = 22$ ; The older children get two more cookies than the younger children. If there are three younger children and four older children and 22 cookies were distributed, how many cookies did the younger children get?; Represent as the situation as an equation and solve).
A3.3.2_P	N/A	A3.3.2_M	N/A	A3.3.2_E	Interpret equations and their solutions in terms of context (e.g., given an algebraic graph, such as a distance-time graph, interpret the slope as speed).

## GRADE 8. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency

Meets Global Minimum Proficiency

Exceeds Global Minimum Proficiency

### N: NUMBER KNOWLEDGE

NI: WHOLE NUMBERS - in grades 7 and 8, this construct is covered in N4: INTEGERS

NI.1: Identify and count in whole numbers, and identify relative magnitude - subconstruct fully covered in grades 1-6 and is, therefore, assumed knowledge for grade 8

NI.2: Represent whole numbers in equivalent ways - subconstruct fully covered in grades 1-6 and is, therefore, assumed knowledge for grade 8

NI.3: Solve operations using whole numbers - see N4.2

NI.4: Solve real-world problems involving whole numbers - see N4.3

### N2: FRACTIONS

N2.1: Identify and represent fractions using objects, pictures, and symbols, and identify relative magnitude - subconstruct fully covered in grades 1-7 and is, therefore, assumed knowledge for grade 8

N2.2: Solve operations using fractions - subconstruct fully covered in grades 1-7 and is, therefore, assumed knowledge for grade 8

N2.3: Solve real-world problems involving fractions - subconstruct fully covered in grades 1-7 and is, therefore, assumed knowledge for grade 8

### N3: DECIMALS

N3.1: Identify and represent decimals using objects, pictures, and symbols, and identify relative magnitude - subconstruct fully covered in grades 1-7 and is, therefore, assumed knowledge for grade 8

N3.2: Represent decimals in equivalent ways (including fractions and percentages)

N3.2.1_P	Round decimal numbers to any place value beyond the hundredths place (e.g., round 3.45619 to 3.4562).	N3.2.1_M	N/A	N3.2.1_E	N/A
N3.2.2_P	Identify and express fractions with any denominator using decimal notation and vice versa (e.g., $752/1000 = 0.752$ ; $7/8 = 0.875$ ).	N3.2.2_M	N/A	N3.2.2_E	N/A
N3.2.3_P	Compare and order fractions, decimals, and percentages (e.g., place these numbers on a number line: 0.4, $1/2$ , 0.50%, $4/5$ , 0.25, $1/3$ , 0.25%).	N3.2.3_M	Compare and order positive and negative decimals and fractions (e.g., place these numbers on a number line from -1 to +1: -0.4, $+1/2$ , $-4/5$ , 0.25, $-1/3$ , $3/4$ ).	N3.2.3_E	N/A

## GRADE 8. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
N3.2.4_P	Identify and express percentages as fractions with denominators of 10 or 100 or as decimals and vice versa (e.g., $80\% = 80/100$ or $8/10$ ; $75\% = 0.75$ ).	N3.2.4_M	Identify and express percentages less than 1% and greater than 100% as fractions or mixed numbers and vice versa (e.g., $124\% = 1\ 24/100$ ; $0.2\% = 2/1000$ ).	N3.2.4_E	N/A
<b>N3.3: Solve operations using decimals</b>					
N3.3.1_P	Add and subtract any positive and negative decimal numbers.	N3.3.1_M	N/A	N3.3.1_E	N/A
N3.3.2_P	Multiply and divide a decimal number by a whole number.	N3.3.2_M	Multiply and divide two decimal numbers and divide a whole number by a decimal.	N3.3.2_E	N/A
<b>N3.4: Solve real-world problems involving decimals</b>					
N3.4.1_P	Solve real-world problems involving addition and subtraction of decimals beyond the tenths place (e.g., <i>Aria has a height of 1.55 meters. Her mother has a height of 1.63 meters. How much taller than Aria is her mother? Adwoa has 1.64 meters of roof sheeting and another 1.4 meters. How many meters of roof sheeting does she have?</i> ).	N3.4.1_M	N/A	N3.4.1_E	N/A
N3.4.2_P	Solve real-world problems involving the multiplication or division of a decimal by a whole number (e.g., <i>Misha buys 4 bags of sugar. Each bag holds 1.5 kg. How many kilos of sugar did he buy? Saira has 2.4 kg of sugar. She wants to separate into three bags of equal size. How many kgs should she put in each bag?</i> ).	N3.4.2_M	Solve real-world problems involving the multiplication or division of two decimal numbers (e.g., <i>Pascal has seven .75 liter containers of olive oil. He sells half of them. How many liters of olive oil did he sell? Or Sheila buys a 4.5 liter barrel of olive oil. She sells them in 0.75 liter containers. How many containers can she make with the 4.5 liter barrel?</i> ).	N3.4.2_E	N/A

### N4: INTEGERS

N4.1: Identify and represent integers using objects, pictures, or symbols, and identify relative magnitude - subconstruct fully covered in grade 7 and is, therefore, assumed knowledge for grade 8

## GRADE 8. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
<b>N4.2: Solve operations using integers - subconstruct fully covered in grade 7 and is, therefore, assumed knowledge for grade 8</b>					
N4.2.1_P	Multiply any two positive integers, with and without regrouping, and divide any integer by a two-digit number, with and without a remainder (e.g., $2342 \times 1478$ ; $3388 \div 15 = \underline{\quad}$ ).	N4.2.1_M	N/A	N4.2.1_E	N/A
N4.2.2_P	Perform calculations involving two or more operations with positive integers, within the limits for meets expectations described above, respecting the order of operations (e.g., $(6584 + 2187) \times 318 = \underline{\quad}$ ; $(9675 - 823) \div 19 = \underline{\quad}$ ).	N4.2.2_M	N/A	N4.2.2_E	N/A
N4.2.3_P	Identify factors of whole numbers beyond 100 and multiples of whole numbers beyond 20 (e.g., find factors of 125 or find multiples of 25).	N4.2.3_M	Identify common factors and common multiples of two numbers (e.g., find the lowest common multiple and the greatest common factor of 12 and 16).	N4.2.3_E	N/A
N4.2.4_P	Perform calculations involving operations with negative integers.	N4.2.4_M	N/A	N4.2.4_E	N/A
<b>N4.3: Solve real-world problems involving integers</b>					
N4.3.1_P	Solve real-world problems involving combinations of any two or more of the four operations, including problems involving measurement and currency units and: * addition and subtraction of any integers * multiplication of any positive integers * division of any positive integers by a positive two-digit number with or without a remainder (e.g., The temperature last night was $-3^{\circ}\text{C}$ . This morning it was $+2^{\circ}\text{C}$ . What was	N4.3.1_M	Solve real-world problems involving the multiplication or division of two integers, including at least one negative integer (e.g., it is $-8^{\circ}\text{C}$ on Tuesday. On Wednesday, it is three times colder. What is the temperature on Wednesday?).	N4.3.1_E	N/A



## GRADE 8. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
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*the change in temperature between last night and this morning?).*

### N5: EXPONENTS AND ROOTS

#### N5.1: Identify and represent exponents and roots using objects, pictures, or symbols, and identify relative magnitude

N5.1.1_P	Identify the square, cube, square root, and cube root of whole numbers using pictures and symbols, and represent a square or cube number using exponential notation <i>(e.g., use square arrays or grids to represent square numbers or identify the square of a number; identify the square of 8 or the square root of 81; represent 64 as 8<sup>2</sup>).</i>	N5.1.1_M	N/A	N5.1.1_E	N/A
N5.1.2_P	N/A	N5.1.2_M	Identify and represent very large whole numbers using scientific notation and positive exponents <i>(e.g., 600 = 6 × 10<sup>2</sup>).</i>	N5.1.2_E	Identify and represent very small numbers using scientific notation and negative exponents <i>(e.g., 0.065 is 6.5 × 10<sup>-2</sup>).</i>
N5.1.3_P	N/A	N5.1.3_M	Compare and order large numbers expressed in scientific notation <i>(e.g., 3.1 × 10<sup>5</sup>, 9.2 × 10<sup>5</sup>, 2.7 × 10<sup>3</sup>; 6.1 × 10<sup>2</sup>).</i>	N5.1.3_E	Compare and order large and small numbers expressed in scientific notation <i>(e.g., 3.1 × 10<sup>5</sup>, 9.2 × 10<sup>-5</sup>, 2.7 × 10<sup>3</sup>; 6.1 × 10<sup>-2</sup>).</i>

#### N5.2: Solve operations involving exponents and roots

N5.2.1_P	N/A	N5.2.1_M	N/A	N5.2.1_E	Multiply and divide quantities expressed in exponential notation, including scientific notation <i>(e.g., 3<sup>5</sup> ÷ 3<sup>2</sup> or 4<sup>3</sup> × 4<sup>2</sup>).</i>
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## GRADE 8. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
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### N6: OPERATIONS ACROSS NUMBER

#### N6.1: Solve operations involving integers, fractions, decimals, percentages, and exponents

<p>N6.1.1_P Perform calculations involving two or more operations with integers, decimals, and fractions, within the limits for partially meets expectations described above, respecting the order of operations.</p>	<p>N6.1.1_M Perform calculations involving two or more operations of integers, decimals, and fractions, within the limits for meets expectations described above, respecting the order of operations.</p>	<p>N6.1.1_E Perform calculations involving two or more operations of integers, decimals, and fractions and exponents, within the limits for exceeds expectations described above, respecting the order of operations.</p>
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### M: MEASUREMENT

#### MI: LENGTH, WEIGHT, CAPACITY, VOLUME, AREA, AND PERIMETER

#### MI.1: Use non-standard and standard units to measure, compare, and order

<p>MI.1.1_P Make conversions between non-adjacent units of length and weight within a standard system of measurement (e.g., convert kilometers to millimeters).</p>	<p>MI.1.1_M Make conversions of units of length and weight between different systems of measurement when the conversion factor is provided (e.g., convert 12 cm to inches given 1 inch is 2.54cm, or convert pounds to kilograms given 1 pound is 0.45 kg).</p>	<p>MI.1.1_E N/A</p>
<p>MI.1.2_P Make conversions between non-adjacent units of capacity/volume within a standard system of measurement (e.g., convert pints to gallons).</p>	<p>MI.1.2_M Make conversions of units of capacity/volume between different systems of measurement where the conversion factor is provided (e.g., convert 750 milliliters to pints given 1 pint is 473 mL).</p>	<p>MI.1.2_E N/A</p>

#### MI.2: Solve problems involving measurement

<p>MI.2.1_P Solve problems, including real-world problems, involving perimeter in which the unknown is a length (e.g., identify the fifth length in a picture of an irregular pentagon with four sides labeled with length and a given perimeter).</p>	<p>MI.2.1_M N/A</p>	<p>MI.2.1_E Solve problems, including real-world problems, involving the calculation of the circumference of a circle given the diameter or radius and vice versa.</p>
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## GRADE 8. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
MI.2.2_P	Solve problems, including real-world problems, involving the calculation of the area of compound shapes comprised of rectangles (e.g., <i>calculate the area of a compound L-shape given a picture with the lengths of all sides provided</i> ).	MI.2.2_M	Solve problems, including real-world problems, involving the calculation of the area of a triangle (e.g., <i>work out the area of a triangle with base length and height given</i> ).	MI.2.2_E	Solve problems, including real-world problems, involving the calculation of the area of a circle given the diameter or radius and vice versa.
MI.2.3_P	N/A	MI.2.3_M	Solve problems, including real-world problems, involving the calculation of the area of compound shapes comprising rectangles and triangles (e.g., <i>calculate the area of a composite shape given a picture of the shape made up of a rectangle connected to a right-angled triangle with the lengths of all sides provided</i> ).	MI.2.3_E	Solve problems, including real-world problems, involving the calculation of the surface area of a familiar polyhedron (i.e., a rectangular prism, square-based pyramid, triangular prism) (e.g., <i>calculate the surface area in square centimeters of a box with a length of 10 cm, width of 10 cm and height of 15 cm</i> ).
MI.2.4_P	N/A	MI.2.4_M	Solve problems, including real-world problems, involving the calculation of the volume of a rectangular prism (e.g., <i>calculate the volume in cubic centimeters of a box with a length of 10 cm, width of 10 cm and height of 15 cm</i> ).	MI.2.4_E	Solve problems, including real-world problems, involving calculating the volume of a non-rectangular prism, given its dimensions (e.g., <i>calculate the volume of a regular triangular prism, with the length of one side of the base and its height provided</i> ).

### M2: TIME

M2.1: Tell time - subconstruct fully covered in grades 1-5 and is, therefore, assumed knowledge for grade 8

#### M2.2: Solve problems involving time

M2.2.1_P	Solve problems, including real-world problems, involving conversion between 12-hour and 24-hour time (e.g., <i>A ferry departs at 1630 hours. It takes 2 hours and 15 minutes to reach its destination. At what time does the ferry arrive at its destination? Give your answer in am/pm time</i> ).	M2.2.1_M	Solve problems, including real-world problems, involving time zones (e.g., <i>When it is 4pm on Tuesday in New York, it is 6 am on Wednesday in Sydney. When it is 11 am on Thursday in Sydney, what time and day will it be in New York?</i> ).	M2.2.1_E	Solve problems, including real-world problems, involving conversion between years, months, weeks, days, hours, fractions of hours or minutes (e.g., <i>Ali spends 2 hours per week practicing piano. How many days per year does he spend practicing piano?</i> ).
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### M3: CURRENCY

## GRADE 8. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
M3.1: Use different currency units to create amounts - subconstruct fully covered in grades 1-3. Questions involving currency are covered under the relevant real-world problem subconstructs (e.g.,N4.3 for integers, etc.)		

### G: GEOMETRY

#### G1: PROPERTIES OF SHAPES AND FIGURES

##### G1.1: Differentiate shapes and figures by their attributes

G1.1.1_P	Use the defining attributes (i.e., type of angle, parallel and perpendicular lines) of complex two-dimensional shapes to classify them.	G1.1.1_M	Recognize and name parts of the circle (i.e., radius, diameter, circumference) and identify the relationship between the radius and diameter.	G1.1.1_E	N/A
G1.1.2_P	Estimate the size of angles by comparing to reference/benchmark angles (e.g., estimate the size of a given angle with reference to the fact that it is smaller than a right angle and larger than 45°).	G1.1.2_M	Use the angle sum of a triangle to solve problems (e.g., determine the missing angle of a triangle where two angles are given).	G1.1.2_E	Use the angle relationships associated with intersecting lines, and with parallel lines intersected by a transverse line to solve problems (e.g., calculate missing angles on a diagram with parallel and intersecting lines).
G1.1.3_P	Recognize single-step two-dimensional shape transformations expressed quantitatively (e.g., rotation by a given fraction of a turn, reflection along a given mirror line, or enlargement by a given scale factor).	G1.1.3_M	Describe and implement two-dimensional shape transformations (i.e., reflection, rotation, translation, enlargement/reduction).	G1.1.3_E	Describe and implement sequential two-dimensional shape transformations (i.e., reflection, rotation, translation, enlargement/reduction).

#### G2: SPATIAL VISUALIZATIONS

##### G2.1: Compose and decompose shapes and figures

G2.1.1_P	Identify alternate views of the same compound or irregular three-dimensional shape, such as its front, top and side view, a rotated view, or a view of a hidden side (e.g., label images (i), (ii), and (iii) as the front, top and side view of the three-dimensional shape).	G2.1.1_M	Identify the net of a familiar three-dimensional figure (i.e. prism, cylinder, cone, or pyramid) (e.g., fold or unfold mentally to answer the question, "What figure does this make when folded?"; "What figure does this make when unfolded?").	G2.1.1_E	Identify a cross-section of a familiar three-dimensional figure (i.e. prism, cylinder, cone, or pyramid) (e.g., identify that the cross section of a cylinder that is not parallel to the base is an ellipse).
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## GRADE 8. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
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### G3: POSITION AND DIRECTION

#### G3.1: Describe the position and direction of objects in space

G3.1.1_P	Draw shapes in the first quadrant of a Cartesian coordinate system, and find missing points (e.g., if (1,1), (1,3) and (1,2) are three corners of a rectangle, identify the fourth corner?).	G3.1.1_M	Locate and plot points on a plane in all four quadrants of a Cartesian coordinate system.	G3.1.1_E	Draw shapes in all 4 quadrants of a Cartesian coordinate system, and find missing points (e.g., If (1,2), (-3,2) and (-3,-2) are three corners of a square, what is the fourth corner?).
G3.1.2_P	Identify horizontal and/or vertical distances between two points in the first quadrant of the Cartesian coordinate system (e.g., using the Cartesian coordinate system, identify how many horizontal and vertical units is (1,1) from (3,4)).	G3.1.2_M	N/A	G3.1.2_E	Describe and implement a single transformation (i.e., reflection, rotation, translation, enlargement/reduction) of a two-dimensional shape in all four quadrants of a Cartesian coordinate system.

### S: STATISTICS AND PROBABILITY

#### SI: DATA MANAGEMENT

##### SI.1: Retrieve and interpret data presented in displays

SI.1.1_P	Retrieve categorical data from pie charts and Venn diagrams and bivariate data from line graphs and dot plots.	SI.1.1_M	Organize data and construct pie charts and Venn diagrams (categorical data), and line graphs and dot plots (bivariate data) when some support is provided (e.g., construct a line graph when given labeled horizontal and/or vertical axes, or match a table to the correct pie chart given a range of pie chart options).	SI.1.1_E	N/A
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##### SI.2: Calculate and interpret central tendency

## GRADE 8. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
SI.2.1_P	Solve problems, including real-world problems, involving calculation of the mean, median, or mode of a set of data.	SI.2.1_M	Describe the effect of adding or removing a specific data value on the mean, median, or mode of a set of data <i>(e.g., What would be the effect of removing a score of 20 from the scores 20, 80, 70 and 75 on the mean? and the possible answers are a) it would increase; b) it would decrease; c) it would stay the same. The same question can be asked about the effect on the median and the mode. Another example is Juanita plays hockey and aims to achieve a mean of 3 goals per game by the end of the season. Her goals for the first four games are shown: 2, 4, 1, 3. She has one more game to play this season. How many goals must she score in this game to achieve her aim?)</i> .	SI.2.1_E	Determine and compare the mean, median, and mode for different sets of data and choose which is most appropriate in a given context <i>(e.g., determine why the median is more appropriate than the mean as a representation of house prices in a given area)</i> .
SI.2.2_P	Compare key features of the distribution of two different but related sets of data <i>(e.g., compare the heights of 10 Grade 4 students to the heights of 10 Grade 7 students with reference to minimum value, maximum value, and spread of the data)</i> .	SI.2.2_M	Compare the distribution of sub-categories within a set of data <i>(e.g., compare temperatures in a 24-hour period split into day temperatures and night temperatures)</i> .	SI.2.2_E	Recognize the effect of outliers in a set of data on the mean and median.
SI.2.3_P	N/A	SI.2.3_M	N/A	SI.2.3_E	Identify desirable characteristics of sampling methods that will enable the mean of a sample to be as close as possible to the mean of a population <i>(e.g., Anoush wants to determine the mean number of siblings each student in her school has. She decides to ask a sample of students. For which of these samples will the mean of the sample be closest to the mean of the whole school? A) The first 10 students she sees in the corridor, B) All the students in her football team, C) Fifty Grade 7 students selected randomly, and D) Fifty students from various grade levels selected randomly)</i> .

## GRADE 8. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
<b>S2: CHANCE AND PROBABILITY</b>					
<b>S2.1: Describe the likelihood of events in different ways</b>					
S2.1.1_P	Calculate the probability of a simple event happening, with the answer expressed as a fraction, decimal, or percentage, and place probability values or events on a continuum from 0 (impossible) to 1 (certain), with 0.5 meaning equal chance of occurring or not occurring. (e.g., <i>What is the probability of rolling a 6 on a standard number dice?</i> ).	S2.1.1_M	Find the expected number of occurrences of a specific independent outcome when a probability experiment is repeated many times (e.g., <i>calculate the expected number of heads with 50 flips of a fair coin.</i> ).	S2.1.1_E	Calculate probabilities of different outcomes for compound events containing two simple events, when they can be listed as a discrete sample space (e.g., <i>calculate the chance of rolling a sum of 7 when rolling two standard number dice.</i> ).
<b>S2.2: Identify permutations and combinations</b>					
S2.2.1_P	N/A	S2.2.1_M	N/A	S2.2.1_E	Systematically count all the possible outcomes (sample space) for a situation involving a compound event comprised of two simple events with replacement (e.g., <i>calculate all of the possible outcomes when selecting a marble from a bag containing 5 marbles, then selecting a second marble after putting the first marble back in the bag</i> ) and without replacement (e.g., <i>calculate all of the possible outcomes when selecting a card randomly from a set containing one yellow, one blue, one red, and one green card, then selecting a second card without putting the first card back into the set.</i> ).

### **A: ALGEBRA**

#### **A1: PATTERNS**

A1.1: Recognize, describe, extend and generate patterns - subconstruct fully covered in grades 1-7 and is, therefore, assumed knowledge for grade 8

#### **A2: EXPRESSIONS**

## GRADE 8. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
<b>A2.1: Evaluate, model, and compute with expressions</b>					
A2.1.1_P	Use linear expressions to represent problem situations with a single variable (e.g., <i>The cost of buying cinema tickets online is £12 per ticket plus a £2 booking fee. Write this as an expression where x is the number of tickets purchased.</i> ).	A2.1.1_M	Use expressions to represent problem situations with multiple variables (e.g., <i>Akeelah bought 4 blouses for x dollars and a wristwatch for y dollars. Represent this as an expression.</i> ).	A2.1.1_E	N/A
A2.1.2_P	Add and subtract linear expressions (e.g., $(3x + 4y) - (2x + 5y)$ ).	A2.1.2_M	Multiply and divide linear monomials, and simplify linear expressions by using the distributive property (e.g., <i>multiply <math>(3x)(5y)</math>; simplify <math>2x(3x + 4)</math>.</i> ).	A2.1.2_E	Multiply two binomial linear expressions (e.g., <i>multiply <math>(3x - 4y)(2x + 5y)</math>.</i> ).
A2.1.3_P	N/A	A2.1.3_M	Evaluate and simplify exponential expressions using the Laws of Exponents (e.g., <i>evaluate <math>2x^3</math> when <math>x = 7</math>; simplify <math>(2x^3)^2</math>.</i> ).	A2.1.3_E	Factor linear and exponential expressions using the greatest common factor (e.g., <i>factor <math>4x^2 + 8xy - 6x</math> to <math>2x(2x + 4y - 3)</math>.</i> ).
<b>A3: RELATIONS AND FUNCTIONS</b>					
<b>A3.1: Solve problems involving variation (ratio, proportion, and percentage)</b>					
A3.1.1_P	Reason proportionally to answer real-world problems involving a ratio (e.g., <i>Purple paint is made from 2 parts blue paint to 3 parts red paint. I have 10 parts of blue paint. How many parts of red paint do I need?; or the ratio of teachers to students on a school trip must be 1:9. How many teachers are needed if there are 36 students?</i> ).	A3.1.1_M	Solve proportions written as two equal ratios (e.g., <i>solve <math>2/3 = 10/x</math>.</i> ).	A3.1.1_E	Write a proportion as two equal ratios to model a proportional relationship (e.g., <i>write <math>2/3 = 10/x</math> to represent a problem that says, 'Purple paint is made from 2 parts blue paint to 3 parts red paint. If I have 10 parts of blue paint. How many parts of red paint do I need?'.</i> ).
A3.1.2_P	Solve problems, including real-world problems, involving finding the percentages of a known quantity (e.g., <i>20% of 70 = ___; A stadium holds 3200 people. If the stadium is 80% full, how many people are in the stadium?</i> ).	A3.1.2_M	Solve problems, including real-world problems, involving percent increase or decrease (e.g., <i>A shirt that normally costs 25 Euros is on sale for 10% off. How much does it cost now?; A shirt cost 25 Euros in November and then 20 Euros in December. What is the percent decrease in cost?</i> ).	A3.1.2_E	Solve problems, including real-world problems, involving percentages where the percentage and final quantity are known, but the initial quantity is not (e.g., <i>Ana paid 8 dollars for a belt that was on sale. The price had been reduced by 20%. What was the original price of the belt?</i> ).
<b>A3.2: Demonstrate an understanding of equivalency - subconstruct fully covered in grades 1-6 and is assumed knowledge for grade 8</b>					



## GRADE 8. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
<b>A3.3: Solve equations and inequalities</b>		
<p><b>A3.3.1_P</b> Represent and solve problems, including real-world problems, using a two-step equation with any of the four operations (e.g., solve <math>3x + 4 = 22</math>; OR, some people got on a bus, doubling the number of passengers. At the next stop, 8 people got off, leaving 16 people on the bus. Represent as an equation, and solve to find the number of people on the bus originally).</p>	<p><b>A3.3.1_M</b> Represent and solve problems, including real-world problems, using more than two steps, including those that involve the distributive property, combining like terms, etc. (e.g., solve <math>3x + 4(x + 2) = 22</math>; The older children get two more cookies than the younger children. If there are three younger children and four older children and 22 cookies were distributed, how many cookies did the younger children get?; Represent as <math>3x + 4(x + 2) = 22</math>) and solve.</p>	<p><b>A3.3.1_E</b> Represent and solve problems, including real-world problems, using two linear equations (e.g., If <math>3x + 4y = 24</math> and <math>4x + 3y = 22</math>, solve for <math>x</math> and <math>y</math>; Or, Andre has more money than Bob. If Andre gives Bob \$20, they would have the same amount. If Bob gave Andre \$22, Andre would then have twice as much as Bob. Represent as two linear equations, and work out how much each of them actually has.).</p>
<p><b>A3.3.2_P</b> N/A</p>	<p><b>A3.3.2_M</b> Interpret equations and their solutions in terms of context (e.g., given an algebraic graph, such as a distance-time graph, interpret the slope as speed).</p>	<p><b>A3.3.2_E</b> Graph linear equations, including those of the form <math>y = k</math> and <math>x = k</math> and calculate the slope of a line from a table, equation, graph, or ordered pairs. Identify the x- and y-intercepts of the graphed line of an equation (e.g., graph <math>y = 5x + 2</math>; graph <math>y = 4</math>; graph <math>x = 4</math>; in the equation <math>y = 3x + 2</math>, identify what the slope is; given a coordinate at (2,4) and a coordinate of (3,7), solve for the slope).</p>

## GRADE 9. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency

Meets Global Minimum Proficiency

Exceeds Global Minimum Proficiency

### N: NUMBER KNOWLEDGE

#### N1: WHOLE NUMBERS

N1.1: Identify and count in whole numbers, and identify relative magnitude - subconstruct fully covered in grades 1-6 and is, therefore, assumed knowledge for grade 9

N1.2: Represent whole numbers in equivalent ways - subconstruct fully covered in grades 1-6 and is, therefore, assumed knowledge for grade 9

N1.3: Solve operations using whole numbers - subconstruct fully covered in grades 1-6 and is, therefore, assumed knowledge for grade 9

N1.4: Solve real-world problems involving whole numbers - subconstruct fully covered in grades 1-6 and is, therefore, assumed knowledge for grade 9

#### N2: FRACTIONS

N2.1: Identify and represent fractions using objects, pictures, and symbols, and identify relative magnitude - subconstruct fully covered in grades 1-7 and is, therefore, assumed knowledge for grade 9

N2.2: Solve operations using fractions - subconstruct fully covered in grades 1-7 and is, therefore, assumed knowledge for grade 9

N2.3: Solve real-world problems involving fractions - subconstruct fully covered in grades 1-7 and is, therefore, assumed knowledge for grade 9

#### N3: DECIMALS

N3.1: Identify and represent decimals using objects, pictures, and symbols, and identify relative magnitude - subconstruct fully covered in grades 1-7 and is, therefore, assumed knowledge for grade 9

N3.2: Represent decimals in equivalent ways (including fractions and percentages) - subconstruct fully covered in grades 1-8 and is, therefore, assumed knowledge for grade 9

N3.3: Solve operations using decimals - subconstruct fully covered in grades 1-8 and is, therefore, assumed knowledge for grade 9

N3.4: Solve real-world problems involving decimals - subconstruct fully covered in grades 1-8 and is, therefore, assumed knowledge for grade 9

#### N4: INTEGERS

N4.1: Identify and represent integers using objects, pictures, or symbols, and identify relative magnitude - subconstruct fully covered in grade 7 and is, therefore, assumed knowledge for grade 9

N4.2: Solve operations using integers - subconstruct fully covered in grades 7-8 and is, therefore, assumed knowledge for grade 9

## GRADE 9. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
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N4.3: Solve real-world problems involving integers - subconstruct fully covered in grades 7-8 and is, therefore, assumed knowledge for grade 9

### N5: EXPONENTS AND ROOTS

N5.1: Identify and represent exponents and roots using objects, pictures, or symbols, and identify relative magnitude

N5.1.1_P	Identify and represent very large whole numbers using scientific notation and positive exponents (e.g., $600 = 6 \times 10^2$ ).	N5.1.1_M	Identify and represent very small numbers using scientific notation and negative exponents (e.g., $0.065$ is $6.5 \times 10^{-2}$ ).	N5.1.1_E	N/A
N5.1.2_P	Compare and order large numbers expressed in scientific notation (e.g., $3.1 \times 10^5$ , $9.2 \times 10^5$ , $2.7 \times 10^3$ ; $6.1 \times 10^2$ ).	N5.1.2_M	Compare and order large and small numbers expressed in scientific notation (e.g., $3.1 \times 10^5$ , $9.2 \times 10^{-5}$ , $2.7 \times 10^3$ ; $6.1 \times 10^{-2}$ ).	N5.1.2_E	N/A

N5.2: Solve operations involving exponents and roots

N5.2.1_P	N/A	N5.2.1_M	Add and subtract quantities expressed in exponential notation (e.g., $3^2 + 3^5 = \underline{\quad}$ including scientific notation).	N5.2.1_E	N/A
N5.2.2_P	N/A	N5.2.2_M	Multiply and divide quantities expressed in exponential notation, including scientific notation (e.g., $3^5 \div 3^2$ or $4^3 \times 4^2$ ).	N5.2.2_E	N/A

### N6: OPERATIONS ACROSS NUMBER

N6.1: Solve operations involving integers, fractions, decimals, percentages, and exponents

N6.1.1_P	Perform calculations involving two or more operations of integers, decimals, and fractions, within the limits for partially meets expectations described above, respecting the order of operations.	N6.1.1_M	Perform calculations involving two or more operations of integers, decimals, fractions, and exponents, within the limits for meets expectations described above, respecting the order of operations.	N6.1.1_E	N/A
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## M: MEASUREMENT

### MI: LENGTH, WEIGHT, CAPACITY, VOLUME, AREA, AND PERIMETER

MI.1: Use non-standard and standard units to measure, compare, and order - subconstruct fully covered in grades 1-8 and is, therefore, assumed knowledge for grade 9

MI.2: Solve problems involving measurement

## GRADE 9. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
M1.2.1_P	N/A	M1.2.1_M	Solve problems, including real-world problems, involving the calculation of the circumference of a circle given the diameter or radius and vice versa.	M1.2.1_E	Use the trigonometric ratios sine, cosine and tangent to calculate an unknown angle of a right-angled triangle given two side lengths, or an unknown side length given an angle and one side length.
M1.2.2_P	Solve problems, including real-world problems, involving the calculation of the area of a triangle (e.g., <i>work out the area of a triangle with base length and height given</i> ).	M1.2.2_M	Solve problems, including real-world problems, involving the calculation of the area of a circle given the diameter or radius and vice versa.	M1.2.2_E	N/A
M1.2.3_P	Solve problems, including real-world problems, involving the calculation of the area of compound shapes comprising rectangles and triangles (e.g., <i>calculate the area of a composite shape given a picture of the shape made up of a rectangle connected to a right-angled triangle with the lengths of all sides provided</i> ).	M1.2.3_M	Solve problems, including real-world problems, involving the calculation of the surface area of a familiar polyhedron (i.e., a rectangular prism, square-based pyramid, triangular prism) (e.g., <i>calculate the surface area in square centimeters of a box with a length of 10 cm, width of 10 cm and height of 15 cm</i> ).	M1.2.3_E	N/A
M1.2.4_P	Solve problems, including real-world problems, involving the calculation of the volume of a rectangular prism (e.g., <i>calculate the volume in cubic centimeters of a box with a length of 10 cm, width of 10 cm and height of 15 cm</i> ).	M1.2.4_M	Solve problems, including real-world problems, involving calculating the volume of a non-rectangular prism, given its dimensions (e.g., <i>calculate the volume of a regular triangular prism, with the length of one side of the base and its height provided</i> ).	M1.2.4_E	N/A
M1.2.5_P	N/A	M1.2.5_M	Solve problems, including real-world problems, involving application of Pythagoras' theorem.	M1.2.5_E	N/A

### M2: TIME

M2.1: Tell time - subconstruct fully covered in grades 1-5 and is, therefore, assumed knowledge for grade 9

### M2.2: Solve problems involving time

M2.2.1_P	Solve problems, including real-world problems, involving time zones (e.g., <i>When it is 4pm on Tuesday in New York, it is 6 am on Wednesday in Sydney. When it is 11 am on Thursday in Sydney, what time and day will it be in New York?</i> ).	M2.2.1_M	Solve problems, including real-world problems, involving conversion between years, months, weeks, days, hours, fractions of hours or minutes (e.g., <i>Ali spends 2 hours per week practicing piano. How many days per year does he spend practicing piano?</i> ).	M2.2.1_E	N/A
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## GRADE 9. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
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### M3: CURRENCY

M3.1: Use different currency units to create amounts - subconstruct fully covered in grades 1-3. Questions involving currency are covered under the relevant real-world problem subconstructs (e.g.,N4.3 for integers, etc.)

### G: GEOMETRY

#### G1: PROPERTIES OF SHAPES AND FIGURES

##### G1.1: Differentiate shapes and figures by their attributes

G1.1.1_P	Recognize and name parts of the circle (i.e., radius, diameter, circumference) and identify the relationship between the radius and diameter.	G1.1.1_M	N/A	G1.1.1_E	N/A
G1.1.2_P	Use the angle sum of a triangle to solve problems (e.g., <i>determine the missing angle of a triangle where two angles are given</i> ).	G1.1.2_M	Use the angle relationships associated with intersecting lines, and with parallel lines intersected by a transverse line to solve problems (e.g., <i>calculate missing angles on a diagram with parallel and intersecting lines</i> ).	G1.1.2_E	Use congruence and similarity criteria to prove relationships in geometric figures and/or prove theorems about triangles.
G1.1.3_P	Describe and implement two-dimensional shape transformations (i.e., reflection, rotation, translation, enlargement/reduction).	G1.1.3_M	Describe and implement sequential two-dimensional shape transformations (i.e., reflection, rotation, translation, enlargement/reduction).	G1.1.3_E	N/A

#### G2: SPATIAL VISUALIZATIONS

##### G2.1: Compose and decompose shapes and figures

G2.1.1_P	Identify the net of a familiar three-dimensional figure (i.e. prism, cylinder, cone, or pyramid) (e.g., <i>fold or unfold mentally to answer the question, 'What figure does this make when folded?'; 'What figure does this make when unfolded?'</i> ).	G2.1.1_M	Identify a cross-section of a familiar three-dimensional figure (i.e. prism, cylinder, cone, or pyramid) (e.g., <i>identify that the cross section of a cylinder that is not parallel to the base is an ellipse</i> ).	G2.1.1_E	N/A
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#### G3: POSITION AND DIRECTION

##### G3.1: Describe the position and direction of objects in space

G3.1.1_P	Locate and plot points on a plane in all four quadrants of a Cartesian coordinate system.	G3.1.1_M	Draw shapes in all 4 quadrants of a Cartesian coordinate system, and find missing points (e.g., <i>If (1,2), (-3,2) and (-3,-2)</i>	G3.1.1_E	N/A
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## GRADE 9. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
G3.1.2_P    N/A	G3.1.2_M Describe and implement a single transformation (i.e., reflection, rotation, translation, enlargement/reduction) of a two-dimensional shape in all four quadrants of a Cartesian coordinate system.	G3.1.2_E Describe and implement sequential transformations (i.e., reflection, rotation, translation, enlargement/reduction) of a two-dimensional shape in all four quadrants of a Cartesian coordinate system.

*are three corners of a square, what is the fourth corner?).*

### S: STATISTICS AND PROBABILITY

#### SI: DATA MANAGEMENT

##### SI.1: Retrieve and interpret data presented in displays

SI.1.1_P Organize data and construct pie charts and Venn diagrams (categorical data), and line graphs and dot plots (bivariate data) when some support is provided (e.g., <i>construct a line graph when given labeled horizontal and/or vertical axes, or match a table to the correct pie chart given a range of pie chart options</i> ).	SI.1.1_M Understand, describe, and use relationships within displays of bivariate data (e.g., <i>describe the strength of association shown in a scatter plot, or a linear relationship between two functionally related variables</i> ).	SI.1.1_E Retrieve and interpret data represented in different ways, including in box plots, stem-and-leaf plots, frequency tables of grouped data
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##### SI.2: Calculate and interpret central tendency

SI.2.1_P Describe the effect of adding or removing a specific data value on the mean, median, or mode of a set of data (e.g., <i>What would be the effect of removing a score of 20 from the scores 20, 80, 70 and 75 on the mean? and the possible answers are a) it would increase; b) it would decrease; c) it would stay the same. The same question can be asked about the effect on the median and the mode. Another example is Juanita plays hockey and aims to achieve a mean of 3 goals per game by the end of the season. Her goals for the first four games are shown: 2, 4, 1, 3. She has one more game to play this season. How</i>	SI.2.1_M Determine and compare the mean, median, and mode for different sets of data and choose which is most appropriate in a given context (e.g., <i>determine why the median is more appropriate than the mean as a representation of house prices in a given area</i> ).	SI.2.1_E Determine the mean, median, or mode of grouped data (e.g., <i>a frequency table with heights arranged into ranges 151 cm to 155 cm, 156 cm to 160 cm, 161 cm to 165 cm, 166 cm to 170 cm</i> ).
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## GRADE 9. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency	Meets Global Minimum Proficiency	Exceeds Global Minimum Proficiency
<p><i>many goals must she score in this game to achieve her aim?).</i></p>		
<p>SI.2.2_P Compare the distribution of sub-categories within a set of data <i>(e.g., compare temperatures in a 24-hour period split into day temperatures and night temperatures).</i></p>	<p>SI.2.2_M Recognize the effect of outliers in a set of data on the mean and median.</p>	<p>SI.2.2_E</p>
<p>SI.2.3_P</p>	<p>SI.2.3_M Identify desirable characteristics of sampling methods that will enable the mean of a sample to be as close as possible to the mean of a population <i>(e.g., Anoush wants to determine the mean number of siblings each student in her school has. She decides to ask a sample of students. For which of these samples will the mean of the sample be closest to the mean of the whole school? A) The first 10 students she sees in the corridor, B) All the students in her football team, C) Fifty Grade 7 students selected randomly, and D) Fifty students from various grade levels selected randomly).</i></p>	<p>SI.2.3_E Determine the median, quartiles, range, and interquartile range from a box plot or stem-and-leaf plot, and construct a box plot from a stem-and-leaf plot.</p>

### S2: CHANCE AND PROBABILITY

S2.1: Describe the likelihood of events in different ways

## GRADE 9. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
S2.1.1_P	Find the expected number of occurrences of a specific independent outcome when a probability experiment is repeated many times (e.g., calculate the expected number of heads with 50 flips of a fair coin).	S2.1.1_M	Calculate probabilities of different outcomes for compound events containing two simple events, when they can be listed as a discrete sample space (e.g., calculate the chance of rolling a sum of 7 when rolling two standard number dice).	S2.1.1_E	Solve real-world problems associated with compound events (e.g., solve problems that require analyzing multi-player games of chance to determine fairness, i.e. whether all players have an equal chance of winning).
S2.1.2_P		S2.1.2_M	Use a wide range of representations such as tree diagrams and two-way tables to explore possible outcomes of chance events and experiments involving multiple compound events (containing 2 or more simple events).	S2.1.2_E	N/A
<b>S2.2: Identify permutations and combinations</b>					
S2.2.1_P	N/A	S2.2.1_M	Systematically count all the possible outcomes (sample space) for a situation involving a compound event comprised of two simple events with replacement (e.g., calculate all of the possible outcomes when selecting a marble from a bag containing 5 marbles, then selecting a second marble after putting the first marble back in the bag) and without replacement (e.g., calculate all of the possible outcomes when selecting a card randomly from a set containing one yellow, one blue, one red, and one green card, then selecting a second card without putting the first card back into the set).	S2.2.1_E	Distinguish between situations involving permutations, where order of selection matters (e.g., codes or pin numbers) and situations involving combinations, where order of selection does not matter (e.g., possible sums from rolling two six-sided dice), and enumerate all possibilities systematically in contexts involving a limited number of outcomes.,

### A: ALGEBRA

#### A1: PATTERNS

A1.1: Recognize, describe, extend, and generate patterns - subconstruct fully covered in grades 1-7 and is, therefore, assumed knowledge for grade 9

#### A2: EXPRESSIONS

A2.1: Evaluate, model, and compute with expressions



## GRADE 9. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
A2.1.1_P	Use expressions to represent problem situations with multiple variables (e.g., <i>Akeelah bought 4 blouses for <math>x</math> dollars and a wristwatch for <math>y</math> dollars. Represent this as an expression</i> ).	A2.1.1_M	N/A	A2.1.1_E	N/A
A2.1.2_P	Multiply and divide linear monomials, and simplify linear expressions by using the distributive property (e.g., <i>multiply <math>(3x)(5y)</math>; simplify <math>2x(3x + 4)</math></i> ).	A2.1.2_M	Multiply two binomial linear expressions (e.g., <i>multiply <math>(3x - 4y)(2x + 5y)</math></i> ).	A2.1.2_E	Factor quadratic trinomial expressions into two binomial linear expressions (e.g., <i>factor <math>x^2 - 3x - 18</math> to <math>(x - 6)(x + 3)</math></i> ).
A2.1.3_P	Evaluate and simplify exponential expressions using the Laws of Exponents (e.g., <i>evaluate <math>2x^3</math> when <math>x = 7</math>; simplify <math>(2x^3)^2</math></i> ).	A2.1.3_M	Factor linear and exponential expressions using the greatest common factor algebraically (e.g., <i>factor <math>4x^2 + 8xy - 6x</math> to <math>2x(2x + 4y - 3)</math></i> ).	A2.1.3_E	Add and subtract monomial and polynomial expressions with exponents, and evaluate polynomial expressions (e.g., <i>add <math>(3x^2 - 4x - 7) + (-6x^2 + 5x - 1)</math>; evaluate <math>3x^2 - 4y^3 - 7</math> when <math>x = -2</math> and <math>y = 2</math></i> ).

### A3: RELATIONS AND FUNCTIONS

#### A3.1: Solve problems involving variation (ratio, proportion, and percentage)

A3.1.1_P	Solve proportions written as two equal ratios (e.g., <i>solve <math>2/3 = 10/x</math></i> ).	A3.1.1_M	Write a proportion as two equal ratios to model a proportional relationship (e.g., <i>write <math>2/3 = 10/x</math> to represent a problem that says, 'Purple paint is made from 2 parts blue paint to 3 parts red paint. If I have 10 parts of blue paint. How many parts of red paint do I need?'</i> ).	A3.1.1_E	N/A
A3.1.2_P	Solve problems, including real-world problems, involving percent increase or decrease (e.g., <i>A shirt that normally costs 25 Euros is on sale for 10% off. How much does it cost now? A shirt cost 25 Euros in November and then 20 Euros in December. What is the percent decrease in cost?</i> ).	A3.1.2_M	Solve problems, including real-world problems, involving percentages where the percentage and final quantity are known, but the initial quantity is not (e.g., <i>Ana paid 8 dollars for a belt that was on sale. The price had been reduced by 20%. What was the original price of the belt?</i> ).	A3.1.2_E	N/A

A3.2: Demonstrate an understanding of equivalency - subconstruct fully covered in grades 1-6 and is, therefore, assumed knowledge for grade 9

A3.3: Solve equations and inequalities

## GRADE 9. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
A3.3.1_P	Represent and solve problems, including real-world problems, using more than two steps, including those that involve the distributive property, combining like terms, etc. (e.g., solve $3x + 4(x + 2) = 22$ ; The older children get two more cookies than the younger children. If there are three younger children and four older children and 22 cookies were distributed, how many cookies did the younger children get?; Represent as $3x + 4(x + 2) = 22$ ) and solve.	A3.3.1_M	Represent and solve problems, including real-world problems, using two linear equations (e.g., If $3x + 4y = 24$ and $4x + 3y = 22$ , solve for $x$ and $y$ ; Or, Andre has more money than Bob. If Andre gives Bob \$20, they would have the same amount. If Bob gave Andre \$22, Andre would then have twice as much as Bob. Represent as two linear equations, and work out how much each of them actually has.).	A3.3.1_E	Solve quadratic equations that have one or two rational solutions, and graph quadratic equations where the quadratic coefficient is positive (e.g., solve $x^2 + 5x + 6 = 0$ ; graph $y = 3x^2 + 5x - 2$ ).
A3.3.2_P	Interpret equations and their solutions in terms of context (e.g., given an algebraic graph, such as a distance-time graph, interpret the slope as speed).	A3.3.2_M	Graph linear equations, including those of the form $y = k$ and $x = k$ and calculate the slope of a line from a table, equation, graph, or ordered pairs. Identify the x- and y-intercepts of the graphed line of an equation (e.g., graph $y = 5x + 2$ ; graph $y = 4$ ; graph $x = 4$ ; in the equation $y = 3x + 2$ , identify what the slope is; given a coordinate at (2,4) and a coordinate of (3,7), solve for the slope).	A3.3.2_E	Construct equations when given two points or the slope and a point (e.g., construct the equation when given the points (1, 5) and (3, 9); Or, construct the equation when given the point (1, 5) and the slope of 2).
A3.3.3_P	Solve one-step inequalities (e.g., $x + 5 < 12$ ).	A3.3.3_M	Solve multi-step inequalities (e.g., $x + 5(x - 2) > 2$ ).	A3.3.3_E	Graph the solution of an inequality on a number line (e.g., graph the solution to $x + 5(x - 2) > 2$ on a number line).
A3.3.4_P	N/A	A3.3.4_M	N/A	A3.3.4_E	Interpret solutions of inequalities in context (e.g., A girl went to the store with \$20 to buy sacks of flour and beans. Each sack of flour cost \$3. She spent \$4 on beans. What is the maximum number of sacks of flour she could buy?).
<b>A3.4: Interpret and evaluate functions</b>					
A3.4.1_P	Identify a function presented as ordered pairs or in an x-y table (e.g., when presented with the following ordered pairs: (-1, 0) (2, 6), (3, 8), (4, 10), identify the function).	A3.4.1_M	Identify a function presented in a graph, either as a set of points or as a continuous line (curved or straight).	A3.4.1_E	Evaluate linear functions (e.g., $f(x) = 2x + 5$ ; find $f(2)$ ).

## GRADE 9. GLOBAL PROFICIENCY DESCRIPTORS

Partially Meets Global Minimum Proficiency		Meets Global Minimum Proficiency		Exceeds Global Minimum Proficiency	
A3.4.2_P	N/A	A3.4.2_M	N/A	A3.4.2_E	Identify or describe characteristics, such as the rate of change, outputs, intercepts, maxima/minima, etc., of a functional relationship between two quantities (e.g., when presented with the following ordered pairs: $(-1, 0)$ , $(2, 6)$ , $(3, 8)$ , $(4, 10)$ , identify the rate of change and intercepts).

## GLOSSARY

Term	Definition
24-hour time	A standard way of expressing time, based on a 24-hour clock, where 0000 is midnight, 1200 is midday and 2359 is one minute to midnight.
Adjacent units	Units within a measurement system that vary by one degree of magnitude. If all the units within that measurement system were to be listed in order of magnitude (e.g. mm, cm, m, km), adjacent units would sit next to each other. For example, centimeters to millimeters are adjacent units; but cm to km are not adjacent units.
Area	A measure of the space within a 2-dimensional shape, measured in square units (e.g. square millimeters, square centimeters, square meters, square kilometers).
Attributes	A characteristic of an object or geometric shape, for example sides, edges, vertices, angles, faces etc.
Binomial linear expressions	A mathematical expression that has two terms and no exponents, for example $3x + 5$ or $6x + 13y$ . When graphed, these expressions make straight lines rather than arcs.
Bivariate data	Data consisting of two sets of values (variables) where each variable from one set is paired with a variable from the other set. For example, age in years graphed against height in centimeters.
Box plot	A data display showing the values for median, first quartile and third quartile of a data set, plotted along a number line. These three values are enclosed within a rectangle or box. Two horizontal lines then extend out from the box, often called 'whiskers', with the line on the left stopping at the minimum value in the data set, and the line on the right stopping at the maximum value for number set.
Cartesian coordinate system	A system in which the location of a point is given by coordinates that represent its distances from perpendicular lines that intersect at a point called the origin.
Categorical data	Data that is arranged into categories
Combination	A listing or count of all the possible selections from a set of options, where order does not matter. For example, how many different combinations of ice-cream flavors are possible when selecting two scoops from a choice of chocolate, strawberry, vanilla, banana and mint.
Commonly used fractions	Fractions that are used frequently in every day life, for example halves, quarters, thirds.
Composite shapes	Composite shapes can be visualized as being comprised of multiple simple shapes, in varying orientations e.g. an 'L-shaped' irregular hexagon comprised of a rectangle oriented horizontally joined to a rectangle oriented vertically; a 'house shaped' irregular pentagon comprised of a square with a triangle sitting on top of the square.
Compound event	A combination of two or more simple events involving probability, for example, flipping two coins; or rolling a standard number cube, then turning a spinner.
Compound shapes/figures	A compound shape/figure is a complex shape/figure made up of two or more simple shapes/figures.
Congruence	Two shapes are said to be congruent if it is possible to superimpose one of them on the other so that they coincide.
Curved line	A smooth, gradually bending line, for example part of the edge of a circle. Curved lines can be open or closed.
Diameter	The distance of a line joining two points on the boundary of a circle and passing through the center of the circle.
Different but related denominators	When one denominator is a multiple of the other. For example the fractions $\frac{1}{4}$ and $\frac{1}{12}$ have different but related denominators.
Distributive property	The idea that multiplying the sum of two or more addends by a number will give the same result as multiplying each addend individually by the number and then adding the products together. For example, if given $4(x+5)$ , one can distribute the 4 to both the x and the 5 to get $4x+20$ , and this will be the same result as if one were to add $x+5$ and then multiply the sum by 4.
Enlargement/reduction	A type of transformation that changes the size of an object.

Term	Definition
Everyday fractions	Fractions used commonly in daily life, including $\frac{1}{2}$ , $\frac{1}{3}$ , $\frac{2}{3}$ , $\frac{1}{4}$ , and $\frac{3}{4}$ . Everyday unit fractions include $\frac{1}{4}$ , $\frac{1}{3}$ , and $\frac{1}{2}$ .
Exponential expressions	A mathematical expression consisting of a constant raised to some power (exponent).
Extrapolating	Deducing the value of a point beyond a given scale or pattern by continuing the pattern or scale continues.
Fluency	The ability to retrieve information quickly and accurately.
Fraction bars	A mathematical manipulative that provides a visual illustration of the relative size of different unit fractions and their relationship to each other and to a common whole, denoted by a bar representing 1.
Function	A relation from a set of inputs to a set of possible outputs where each input is related to exactly one output.
Functionally related variables	Variables that are related to each other by a rule or function, such that, when we know the value of one variable, we can calculate or determine the value of the other variable. For example, number of weeks and number of days are functionally related to each other by the rule 'one week is equal to seven days'. So if a data set gives number of weeks e.g. 1, 2, 3, 4, 5, another functionally related data set can be generated showing corresponding number of days, e.g. 7, 14, 21, 28, 35 etc.
Greatest common factor	The greatest number that is a factor of two (or more) other numbers, meaning the number (factor) can be divided into the two or more other numbers evenly, without a remainder. For example, the greatest common factor of 24, 48, and 60 is 12.
Grid map	A map on which a network of horizontal and vertical lines are superimposed, for locating points.
Grouped data	When raw numerical data is sorted and into groups of similar measurements in a frequency table, it is called grouped data. For example, arranging the ages of survey respondents into age ranges such as 0-4 years, 5-9 years, 10-14 years, 15-19 years etc. and placing these in the first column of a frequency table, with a count of the number of individual responses that fall into each age range, called 'frequency', in the second column of the table.
Improper fractions	A fraction that is great than one, with the numerator greater than the denominator, for example $\frac{5}{4}$ or $\frac{10}{8}$ .
Integers	Whole numbers and negative numbers, but not fractions.
Interpolating	Deducing the value of a point on a scale between two labelled points by using the relative distance between the labelled points and that point.
Interquartile range	The difference between the upper quartile and the lower quartile In an ordered data set.
Labelled scale increments	Increments or markings on a measurement scale that are accompanied by a number label, e.g. a major mark on a kitchen scale with the label '1 kg' directly beneath it.
Laws of Exponents	The laws that govern how to solve problems containing exponents. For example, when multiplying like bases, the base stays the same and the exponents get added together. When raising a base with a power to another power, the base stays the same and the exponents are multiplied;. When dividing like bases, the base stays the same and the denominator exponent is subtracted from the numerator exponent.
Line graph	A type of graph that is used to present bivariate data, where both sets of data are continuous variables (variables that are measured, not counted e.g. height, length, mass, temperature, time, etc.). A line is plotted on a pair of axes, with any given point on the plotted line having a horizontal component representing the value of a variable from one set and a vertical component representing the value of a variable from the other set.
Line of symmetry	A line that can be drawn on a shape to divided into two equal halves (where one is the mirror image of the other).
Linear expressions	A mathematical expression that only has one variable in it and no exponents, for example; $mx + b$ . When graphed, these expressions make straight lines rather than arcs.
Linear monomial	A mathematical expression with only one term and no exponents, for example $3x$ or $7y$ . When graphed, these expressions make straight lines rather than arcs.

Term	Definition
Lower quartile	The value midway between the minimum value and the median in an ordered data set.
Lowest common multiple	The lowest number that is a multiple of two or more given number. For example, the lowest common multiple of 3, 6, and 12 is 24.
Map	A diagrammatic representation of a physical space.
Mean	A measure of central tendency in statistics, calculated by adding all values in a data set and dividing by the number of values in the data set.
Median	A measure of central tendency in statistics, determined by ordering all values in a data set from smallest to largest, then finding the value that lies in the middle of the ordered set.
Minuend	The minuend is the first number in a subtraction. It is the number from which another number (the Subtrahend) is to subtracted. Minuend – subtrahend = difference.
Mixed numbers	A whole number and a proper fraction represented together, for example $1\frac{3}{4}$ or $2\frac{1}{6}$ .
Mode	A measure of central tendency in statistics, determined by identifying the most frequently occurring value in a set of data.
Monomial	A mathematical expression with only one term, for example $12y$ or $3x^2$ .
Multi-unit scale	A scale where each unit represents a multiple value; for example, each unit on the scale represents 10 items, or 20 items.
Multibase arithmetic blocks	Wooden or plastic blocks used to help promote an understanding of the number system. They give a concrete representation of numbers, emphasising the place-value aspect.
Multiplicand	The number to be multiplied is the "multiplicand". In $8 \times 32$ , the multiplicand is 32.
Multiplier	The number by which another number is multiplied. In $8 \times 32$ , the multiplier is 8.
Net	A two-dimensional pattern of a three-dimensional figure that can be folded to form the figure.
Non-adjacent units	Units within a measurement system that vary by <b>more</b> than one degree of magnitude. If all the units within that measurement system were to be listed in order of magnitude (e.g. mm, cm, m, km or mg, g, kg, tonnes), non-adjacent units would have other intermediate units between them. For example cm and km are non-adjacent units as are grams and tons.
Non-linear patterns	An increasing or decreasing number pattern where the relationship between terms in the pattern is not a constant value. The Fibonacci sequence of 1, 2, 3, 5, 8, 13, 21...etc is an example of a non linear pattern. it increases according to a set rule (i.e., each term is the sum of the two previous terms), but not by a constant value. . In contrast, a pattern like 2, 4, 6, 8, 10... is linear pattern. The difference between the terms is a constant value: 2.
Non-unit fractions	Fractions with a numerator of greater than one.
Number bond	The pairs of numbers, that when added, give a particular number. For example, the number bonds for 6 are 5 and 1, 6 and 0, 2 and 4, and 3 and 3.
Ordered pairs	A composition of the x-coordinate and the y-coordinate on a graph, usually written as (x, y).
Outlier	A point in a set of data that varies significantly from the other points in the data set.
Parallel lines	Two straight lines in a plane that do not intersect at any point.
Perimeter	The distance around the boundary of a 2D shape, calculated by adding the length of all sides.
Permutation	A listing or count of all the possible arrangements of a set of items, where sequence of the items in the set matters, for example, how many different 4-digit codes can be made using only the digits 0, 1, 2, 3, 4, 5 and 6 without repeating any digits.
Perpendicular lines	Two straight lines at right-angles to each other.
Pie chart	A diagram used to present data arranged into categories, showing a circle is divided into sections, with each section representing a category as a proportion of the entire set of data.
Plane	A two-dimensional surface.

Term	Definition
Polygon	A 2-dimensional closed shape with sides that are all straight lines and an equal number of angles as there are sides, for example, a square, triangle, rectangle, etc.
Polygon (regular and irregular)	A two-dimensional shape bounded by three or more straight lines. A regular polygon has equal side lengths and angles. All other polygons are irregular.
Polyhedron	A 3-dimensional shape, comprised of multiple faces that are all polygons.
Polynomial expressions	An expression which is a monomial, or the sum (or difference) of two or more monomials.
Prism	A 3-D shape (polyhedron) comprised of faces that are polygons, with two of these faces (called bases) that are identical and all other faces being parallelograms
Prism	A 3-D shape (polyhedron) comprised of faces that are polygons, with two of these faces (called bases) that are identical and all other faces being parallelograms
Proper fractions	A fraction that is less than one, with the numerator less than the denominator, for example $1/2$ or $4/5$
Pythagoras' Theorem	A theorem stating that the square of the length of the hypotenuse of a right triangle is equal to the sum of the squares of the lengths of the other sides.
Quadrant	The four regions into which a plane is divided by the axes of a Cartesian coordinate system.
Quadratic equations	An equation containing a single variable of degree 2 (the square of the variable). Its general form is $ax^2 + bx + c = 0$ , where $x$ is the variable and $a$ , $b$ , and $c$ are constants ( $a \neq 0$ ).
Quadratic trinomial expressions	A mathematical expression of the form: $a x^2 + b x + c$ , where $x$ is a variable and $a$ , $b$ and $c$ are non-zero constants. The constant $a$ is called the leading coefficient, $b$ is called the linear coefficient, and $c$ is called the additive constant.
Quadrilaterals	A four-sided polygon.
Quartiles	In an ordered list of data, the data values that separate the data into quarters. The lower quartile is the value of the middle point between the minimum value and the median and the upper quartile is the value midway between the median and the maximum value.
Radius	The distance from a point on the boundary of a circle to the center of the circle.
Range	The difference between the minimum and maximum values in a dataset.
Rate of change	A rate that describes how one quantity changes in relation to another quantity. For example, if $x$ is the independent variable and $y$ is the dependent variable, then the rate of change = change in $y$ (change in $x$ ).
Rectangular array	An arrangement of objects into rows and columns that form a rectangle. Each row has the same number of objects. Each column has the same number of objects. The number of objects in each row is different from the number of objects in each column.
Reflection	A type of transformation where each point in a shape appears at an equal distance on the opposite side of a given line - the line of reflection.
Repeating patterns	Patterns made up of core set of terms that repeat themselves. The pattern circle square circle square circle square circle... is a repeating patterns. The core elements that repeat are circle square circle.
Rotation	A type of transformation where each point in a shape is turned around a center or axis but remains the same distance from the center or axis.
Scatter plot	A type of graph that is used to present bivariate data, showing a series of points plotted on a pair of axes. Each point on the graph represents a pair of values, with the horizontal component of the point showing the value of a variable from one set of data and the vertical component of the point showing the value of a variable from the other set of data (e.g. a scatter plot graphing ages of children along the horizontal axis against heights of children along the vertical axis).
Similarity	Two shapes are said to be similar if they are the same shape but different sizes.
Single-unit scale	A scale where each unit represents one of something; e.g., 1, 2, 3, 4, 5, 6.
Slope	The ratio of the vertical changes between two points, often called the rise, to the horizontal change between the same two points, often called the run.

Term	Definition
Square array	An arrangement of objects into rows and columns that form a square. Each row has the same number of objects. Each column has the same number of objects. The number of objects in each row is the same as the number of objects in each column.
Stem-and-leaf plot	A diagram used to order and summarize multidigit data, where the first column (called the stem) contains all digits in the number apart from the last digit, and the second column (the 'leaf' contains the last digits of each number and each leaf is placed next its corresponding 'stem' and ordered from smallest to largest. Stem-and-leaf plots are useful for efficiently determining median, quartiles and interquartile range of multi-digit data.
Straight line	The path of shortest distance between two points.
Strength of association	The degree to which the values of two variables vary or change together.
Subtrahend	The subtrahend is the second number in a subtraction. It is the number subtracted from another number (the minuend). Minuend – subtrahend = difference.
Sum	The aggregate of two or more numbers, magnitudes, quantities, as determined by the process of addition. For example, the sum of 6 and 8 is 14.
Surface area	The total area of the surface of a 3D shape e.g. the area of all the faces on a polyhedron added together.
Time zones	Variations in standard time, which vary based on geographical regions.
Translation	A type of transformation where each point in a shape moves by a set distance horizontally and vertically
Transverse lines	A straight line that cuts across two or more (usually parallel) lines.
Tree diagram	A tool used in Mathematics to help calculate the number of possible outcomes in a series of events or a problem, and to list these possible outcomes in a systematic way. In probability, tree diagrams are used to represent a sequence of events, with each possible outcome in each event represented as a branch on a tree, and the probability of each outcome written as a probability along each branch.
Two-way table	A type of frequency table used to depict the relationships between two categorical variables, with each cell in a two-way table representing a count which is an intersection of the two categorical variables. For example when trying to depict the favorite music type out of pop, country and rock for children in Grade 7 and Grade 8, music type will be listed in row headers and grade level in columns, with counts of each in the remaining cells. The last column and the last row in two-way tables often give total counts (frequencies) for example the total of the first row may would be total number of students from Grade 7 who answered the question, the first column total would be total students in both Grades 7 and Grade 8 who chose pop. (see attached image of two-way table example).
Unit fractions	A fraction with a numerator of 1.
Unit ratio	A two-term ratio expressed with a second term of one.
Unlabeled scale increments	Increments or markings on a measurement scale that are not accompanied by a number label, but whose label can be deduced by other labelled increments on the scale e.g. an unlabeled increment between 1 centimeter and 2 centimeters on a ruler is known to be 1.5 without needing the associated number label.
Upper quartile	The value midway between the median and the maximum value in an ordered data set.
Venn diagram	A diagram that uses counts within circles (often overlapping circles) to represent the relationships between different sets of data (e.g. the results of a survey about two different sports, with one circle representing each sport, circles overlapping with numbers in the overlap showing students that play both sports, numbers outside circles showing students playing neither sport, and numbers in one circle but not another showing students that play only one of the two sports).
X-intercept	The point at which the graph crosses the x-axis.
Y-intercept	The point at which the graph crosses the y-axis.