ESSENTIAL ELEMENTS FOR GRADE 3: MATHEMATICS

**Claim #1: Students demonstrate increasingly complex understanding of number sense.

Operations and Algebraic Thinking

Target Essential Element	Michigan Range of Complexity		
	High Range	Medium Range	Low Range
Michigan Grade 3 Standard for Mathematics: 3.OA.4: Determine the unknown whole number in a multiplication or division equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = _ ÷ 3, 6 × 6 = ?*			
EE.3.OA.4: Solve addition and subtraction problems when result is unknown, limited to operands and results within 20.	EE.3.OA.H.4: The student can solve addition and subtraction problems with sums and differences 0 to 20.	EE.3.OA.M.4: The student can solve addition and subtraction with sums and differences within 10.	EE.3.OA.L.4: The student can recognize numbers 1-5 when compared with non-numeric symbols or objects.

Number and Operations in Base 10

Target Essential Element	Michigan Range of Complexity		
	High Range	**Medium Range**	**Low Range**
Michigan Grade 3 Standard for Mathematics: 3.NBT.1: Use place value understanding to round whole numbers to the nearest 10 or 100.			
EE.3.NBT.1: Use decade numbers (10, 20, 30) as benchmarks to demonstrate understanding of place value for numbers 0-30.	**Michigan Range of Complexity:** Not measured at state level, range of complexity determined at classroom level.		
Michigan Grade 3 Standard for Mathematics: 3.NBT.2: Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.			
EE.3.NBT.2: Demonstrate understanding of place value to tens.	**EE.3.NBT.H.2**: The student can identify correct representations of whole numbers to 50 using models, such as base 10 blocks, coins, etc.	**EE.3.NBT.M.2**: The student can identify decade numbers to 50 (10, 20, 30, 40, 50) represented with models or concrete objects.	**EE.3.NBT.L.2**: The student can differentiate between more and less when given two sets of objects with extreme differences.
Michigan Grade 3 Standard for Mathematics: 3.NBT.3: Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.			
EE.3.NBT.3: Count by tens using models such as objects, base ten blocks, or money.	**EE.3.NBT.H.3**: The student can count by tens to 100 using objects, base ten blocks or money.	**EE.3.NBT.M.3**: The student can count by tens to 50 using base ten blocks or money.	**EE.3.NBT.L.3**: The student can identify a single group of ten (using objects or a model) when compared with another quantity that is limited to no more than 5.

Number and Operations - Fractions

Target Essential Element	Michigan Range of Complexity		
	High Range	Medium Range	Low Range
Michigan Grade 3 Standards for Mathematics: **3.NF.1**: Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction a/*b* as the quantity formed by *a* parts of size 1/*b.* **Michigan Grade 3 Standards for Mathematics**: **3.NF.2**: Understand a fraction as a number on the number line; represent fractions on a number line diagram. **Michigan Grade 3 Standards for Mathematics**: **3.NF.2.a**: Represent a fraction 1/*b* on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that each part has size 1/*b* and that the endpoint of the part based at 0 locates the number 1/*b* on the number line. **Michigan Grade 3 Standards for Mathematics**: **3.NF.2.b**: Represent a fraction a/*b* on a number line diagram by marking off a lengths 1/*b* from 0. Recognize that the resulting interval has size *a/b* and that its endpoint locates the number *a/b* on the number line. **Michigan Grade 3 Standards for Mathematics**: **3.NF.3**: Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. **Michigan Grade 3 Standards for Mathematics**: **3.NF.3.a**: Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. **Michigan Grade 3 Standards for Mathematics: 3.NF.3.b**: Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3. Explain why the fractions are equivalent, e.g., by using a visual fraction model. **Michigan Grade 3 Standards for Mathematics**: **3.NF.3.c**: Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.* **Michigan Grade 3 Standards for Mathematics**: **3.NF.3.d**: Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.			
EE.3.NF.1-3: Differentiate a fractional part from a whole.	**EE.3.NF.H.1-3**: The student can use a model to identify a given unit fraction (limited to one-half and one-fourth).	**EE.3.NF.M.1-3**: The student can use a model or concrete objects to identify a whole object or one-half of an object.	**EE.3.NF.L.1-3**: The student can differentiate between a whole object and some of an object.

****Claim #2: Students demonstrate increasingly complex spatial reasoning and understanding of geometric principles.**

Geometry

Target Essential Element	Michigan Range of Complexity		
	High Range	**Medium Range**	**Low Range**
Michigan Grade 3 Standard for Mathematics: 3.G.1: Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.			
EE.3.G.1: Describe attributes of two-dimensional shapes.	**EE.3.G.H.1**: The student can describe the attributes (i.e., number of sides, corners, angles) of common two-dimensional shapes.	**EE.3.G.M.1**: The student can identify a side or an angle in a common two-dimensional shape.	**EE.3.G.L.1**: The student can identify a circle, a square, and a triangle.
Michigan Grade 3 Standard for Mathematics: 3.G.2: Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example, partition a shape into 4 parts with equal area, and describe the area of each part as ¼ of the area of the shape.*			
EE.3.G.2: Recognize that shapes can be partitioned into equal areas.	**EE.3.G.H.2**: The student can identify shapes that can be partitioned into equal parts when provided with a visual model (limited to halves, thirds, and fourths).	**EE.3.G.M.2**: The student can identify shapes that are divided equally when given a visual model (limited to halves and fourths).	**EE.3.G.L.2**: The student can recognize one-half of a shape.

****Claim #3: Students demonstrate increasingly complex understanding of measurement, data and analytic procedures.**

Using Measurement and Data

Target Essential Element	Michigan Range of Complexity		
	High Range	Medium Range	Low Range
Michigan Grade 3 Standard for Mathematics: 3.MD.1: Tell and write time to the nearest minute, and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.			
EE.3.MD.1: Tell time to the hour on a digital clock.	**EE.3.MD.H.1**: The student can tell time to the hour on a digital clock.	**EE.3.MD.M.1**: The student can identify the hour on a digital clock.	**EE.3.MD.L.1**: The student can recognize that a clock is used to measure time.
Michigan Grade 3 Standard for Mathematics: **3.MD.2**: Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.			
EE.3.MD.2: Identify the appropriate measurement tool to solve one-step word problems involving mass and volume.	**EE.3.MD.H.2**: The student can identify tools used to measure mass (scale) and/or volume (measuring cups).	**EE.3.MD.M.2**: The student can identify tools used to measure mass (scale) and volume (measuring cups).	**EE.3.MD.L.2**: The student can identify a tool used to measure a solid (i.e., scale or ruler) when presented within a context where the appropriate measurement tool is needed.
Michigan Grade 3 Standard for Mathematics: 3.MD.3: Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. *For example, draw a bar graph in which each square in the bar graph might represent 5 pets.*			
EE.3.MD.3: Use picture or bar graph data to answer questions about data.	**EE.3.MD.H.3**: The student can use a bar graph or a simple pictograph to answer questions about data.	**EE.3.MD.M.3**: The student can organize data using pictures or concrete objects that can be collected and sorted (maximum of 10 objects and 1 attribute).	**EE.3.MD.L.3**: The student can identify 2 objects that share a common attribute when presented within a context.

Target Essential Element	Michigan Range of Complexity		
	High Range	**Medium Range**	**Low Range**
Michigan Grade 3 Standard for Mathematics: 3.MD.4: Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.			
EE.3.MD.4: Measure length of objects using standard tools, such as rulers, yardsticks, and meter sticks.	EE.3.MD.H.4: The student can use a ruler to measure length to the nearest whole unit.	EE.3.MD.M.4: The student can identify the length of an object measured using informal (non-standard) units.	EE.3.MD.L.4: The student can identify the object that is longer or shorter when presented with objects that have extreme differences in length.

****Claim #4: Students solve increasingly complex mathematical problems, making productive use of algebra and functions.**

Problem Solving

Target Essential Element	Michigan Range of Complexity		
	High Range	**Medium Range**	**Low Range**
Michigan Grade 3 Standard for Mathematics: **3.OA.1**: Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as 5 × 7.* **Michigan Grade 3 Standard for Mathematics**: **3.OA.2**: Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. *For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.*			
EE.3.OA.1-2: Use repeated addition to find the total number of objects and determine the sum.	**EE.3.OA.H.1-2**: The student can use repeated addition (using the same number) to find a sum up to 20.	**EE.3.OA.M.1-2**: The student can add equal groups of objects to find the sum of objects to 10.	**EE.3.OA.L.1-2**: The student can distinguish between more and less (fewer).
Michigan Grade 3 Standard for Mathematics: **3.OA.8**: Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.			
EE.3.OA.8: Solve one-step real-world problems using addition or subtraction within 20.	**EE.3.OA.H.8**: The student can solve one-step real world problems using addition or subtraction with sums and differences within 20.	**EE.3.OA.M.8**: The student can solve one-step real world problems using addition or subtraction with sums/differences within 10.	**EE.3.OA.L.8**: The student can solve one-step real world problems using counting with quantities up to 5.

Target Essential Element	Michigan Range of Complexity		
	High Range	**Medium Range**	**Low Range**
Michigan Grade 3 Standard for Mathematics: 3.OA.9: Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. *For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.*			
EE.3.OA.9: Identify arithmetic patterns.	**EE.3.OA.H.9**: The student can create, describe and extend simple number patterns.	**EE.3.OA.M.9**: The student can create, describe, and/or extend simple number patterns or patterns involving objects or symbols.	**EE.3.OA.L.9**: The student can recognize same or different within a simple pattern involving objects or symbols.

Target Essential Elements as developed by: Dynamic Learning Maps Consortium (2013). Dynamic Learning Maps Essential Elements for Mathematics. Lawrence, KS: University of Kansas.