OKLAHOMA ACADEMIC STANDARDS MATHEMATICS EMPLOYABILITY SKILLS

A Cross-Industry Approach to Foundational Skills EMPLOYABILITY SKILLS	Alignment in Oklahoma Academic Standard Mathematics
APPLIED KNOWLEDGE: MATHEMATICS Use mathematics to solve problems	
Add, subtract, multiply, and divide whole numbers, fractions, decimals, and percents	**2.N.2.2** Demonstrate fluency with basic addition facts and related subtraction facts up to 20. **4.N.1.1** Demonstrate fluency with multiplication and division facts with factors up to 12. **5.N.3.3** Add and subtract fractions with like and unlike denominators, mixed numbers, and decimals, using efficient and generalizable procedures, including but not limited to standard algorithms in order to solve real-world and mathematical problems including those involving money, measurement, geometry, and data. **6.N.4.3** Multiply and divide fractions and decimals, using efficient and generalizable procedures.
Convert decimals to fractions; convert fractions to percents	**5.N.2** Read, write, represent, and compare fractions and decimals; recognize and write equivalent fractions; convert between fractions and decimals; use fractions and decimals in real-world and mathematical situations. **6.N.1.4** Determine equivalencies among fractions, decimals, and percents. Select among these representations to solve problems.
Calculate averages, ratios, proportions, and rates	**6.D.1.1** Calculate the mean, median, and mode for a set of real-world data. **6.N.3** Understand the concept of ratio and its relationship to fractions and percents and to the multiplication and division of whole numbers. Use ratios to solve real-world and mathematical problems. **7.A.2** Recognize proportional relationships in real-world and mathematical situations; represent these and other relationships with tables, verbal descriptions, symbols, and graphs; solve problems involving proportional relationships and interpret results in the original context.

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APPLIED KNOWLEDGE: MATHEMATICS Use mathematics to solve problems	
Take measurement of time, temperature, distance, length, width, height, and weight; convert one measurement to another	**4.GM.3** Determine elapsed time and convert between units of time. **3.GM.2.6** Use an analog thermometer to determine temperature to the nearest degree in Fahrenheit and Celsius. **4.GM.2.5** Solve problems that deal with measurements of length, when to use liquid volumes, when to use mass, temperatures above zero, and money using addition, subtraction, multiplication, or division as appropriate (customary and metric). **6.GM.3.2** Solve problems in various real-world and mathematical contexts that require the conversion of weights, capacities, geometric measurements, and time within the same measurement systems using appropriate units.
Translate practical problems into useful mathematical expressions	**6.A.3.1** Represent real-world or mathematical situations using expressions, equations, and inequalities involving variables and rational numbers. **7.N.2.3** Solve real-world and mathematical problems involving addition, subtraction, multiplication, and division of rational numbers; use efficient and generalizable procedures including but not limited to standard algorithms. **PA.A.4** Represent real-world and mathematical problems using equations and inequalities involving linear expressions. Solve and graph equations and inequalities symbolically and graphically. Interpret solutions in the original context. **A1.F.1.3** Write linear functions, using function notation, to model real-world and mathematical situations.

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CRITICAL THINKING:
Use logical thought processes to analyze and draw conclusions

Identify inconsistent or missing information

Critically review, analyze, synthesize, compare, and interpret information

Draw conclusions from relevant and/or missing information

Test possible hypotheses to ensure that the problem is correctly diagnosed and the best solution is found

5.A.2.2 Determine whether an equation or inequality involving a variable is true or false for a given value of the variable.

6.D.1.2 Explain and justify which measure of central tendency (mean, median, or mode) would provide the most descriptive information for a given set of data.

7.A.2.4 Use proportional reasoning to assess the reasonableness of solutions.

7.D.2.3 Use proportional reasoning to draw conclusions about and predict relative frequencies of outcomes based on probabilities.

A1.F.1.1 Distinguish between relations and functions.

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WORKPLACE SKILLS
PROBLEM SOLVING:

Demonstrate the ability to apply critical-thinking skills to solve problems by generating, evaluating, and implementing solutions

Able to identify and define the problem

Will communicate the problem to appropriate personnel

Capable of generating possible solutions

Ability to choose and implement a solution

Mathematical Actions and Processes:
Develop Strategies for Problem Solving
Students will select from a variety of problem-solving strategies and use corresponding multiple representations (verbal, physical, symbolic, pictorial, graphical, and tabular) when appropriate. They will pursue solutions to various tasks from real-world situations and applications that are often interdisciplinary in nature. They will find methods to verify their answers in context and will always question the reasonableness of solutions.

Mathematical Actions and Processes:
Develop the Ability to Communicate Mathematically
Students will discuss, write, read, interpret, and translate ideas and concepts mathematically. As they progress, students' ability to communicate mathematically will include their increased use of mathematical language and terms and analysis of mathematical definitions.

Mathematical Actions and Processes:
Develop a Deep and Flexible Conceptual Understanding
Students will develop an understanding of how and when to apply and use the mathematics they know to solve problems.

Mathematical Actions and Processes:
Develop the Ability to Make Conjectures, Model & Generalize
Make predictions and conjectures and draw conclusions throughout the problem-solving process based on patterns and the repeated structures in mathematics. Students will create, identify, and extend patterns as a strategy for solving and making sense of problems.

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DECISION MAKING:

Apply critical thinking skills to solve problems encountered in the workplace

Identify and prioritize the key issues involved to facilitate the decision-making process

Anticipate the consequences of decisions

Involve people appropriately in decisions that may impact them

Quickly respond with a back-up plan if a decision goes amiss

Mathematical Actions and Processes:
Develop Mathematical Reasoning
Explore and communicate a variety of reasoning strategies to think through problems. Students will apply their logic to critique the thinking and strategies of others to develop and evaluate mathematical arguments, including making arguments and counterarguments and making connections to other contexts.

Mathematical Actions and Processes:
Develop a Productive Mathematical Disposition
Hold the belief that mathematics is sensible, useful, and worthwhile. Students will develop the habit of looking for and making use of patterns and mathematical structures. They will persevere and become resilient, effective problem solvers.

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WORKING WITH TOOLS & TECHNOLOGY: Select, use, and maintain tools and technology to facilitate work activity	
Identify, select, and use appropriate tools and technological solutions to frequently encountered problems	**3.N.2.5** Use addition and subtraction to solve real-world and mathematical problems involving whole numbers. Use various strategies, including the relationship between addition and subtraction, the use of technology, and the context of the problem to assess the reasonableness of results.
Carefully consider which tools or technological solutions are appropriate for a given job and consistently choose the best tool or technological solution for the problem at hand	**4.N.1.5** Solve multi-step real-world and mathematical problems requiring the use of addition, subtraction, and multiplication of multi-digit whole numbers. Use various strategies, including the relationship between operations, the use of appropriate technology, and the context of the problem to assess the reasonableness of results.
Operate tools and equipment in accordance with established operating procedures and safety standards	**7.D.1.2** Use reasoning with proportions to display and interpret data in circle graphs (pie charts) and histograms. Choose the appropriate data display and know how to create the display using a spreadsheet or other graphing technology.
Seek out opportunities to improve knowledge of tools and technologies that may assist in streamlining work and improving productivity	**A1.D.1.1** Describe a data set using data displays, describe and compare data sets using summary statistics, including measures of central tendency, location, and spread. Know how to use calculators, spreadsheets, or other appropriate technology to display data and calculate summary statistics.
	A2.A.1.4 Solve polynomial equations with real roots using various methods and tools that may include factoring, polynomial division, synthetic division, graphing calculators, or other appropriate technology.