

Course Syllabus

Mathematics, Grade 2

Grade 2 Math, Final
Guardian Angels School

The Foundations of Learning (1999) curriculum offers kindergarten through grade 12 objectives for the Knowledge and Comprehension levels of Bloom's Taxonomy. EdVISION developed this curriculum based on extensive research of standardized and state tests. Additional objectives were added to enhance the content areas.

The mathematics component of the Foundations of Learning curriculum focuses on basic skills. Objectives primarily involve the identification, recognition, comprehension, or understanding of various math topics.

The Principles and Standards for School Mathematics describe the mathematical understanding, knowledge, and skills that students should acquire from prekindergarten through grade 12.

The ITBS Form A for mathematics measures the skills and achievement of students.

In this area students concentrate on making mathematical connections and using principles of mathematics to communicate, reason, and solve problems. Students engage in projects which require them to apply number systems, operations, and forms in real-world contexts.

The MEAP assesses student progress in Mathematics.

The Michigan Curriculum Framework describes Mathematics as the science of patterns and relationships and as the language and logic of our technological world. The Michigan Curriculum Framework states that Mathematical power is the ability to explore, to conjecture, to reason logically, and to use a variety of mathematical methods effectively to solve problems; whereas the ultimate goal of mathematics education is for all students to develop mathematical power to participate fully as a citizen and worker in our contemporary world.

The Michigan Curriculum Framework Mathematics Vision Statement states that a mathematically powerful individual should be able to:

- * reason mathematically
- * communicate mathematically
- * problem solve using mathematics

* make connections within mathematics and between mathematics and other fields.

The Foundations of Learning curriculum provides objectives for second grade students.

The Principles and Standards for School Mathematics provide standards for students in prekindergarten through grade 2.

Algebraic Concepts

The Algebraic Concepts Unit includes Competencies/Objectives which focus on algebraic equations and operations. Students explore the symbolic nature of algebraic concepts by identifying and extending patterns in algebra, by following algebraic procedures, and by proving theorems with properties.

- The learner will be able to apply many different methods and tools to perform computations, including objects, mental computation, estimation, paper and pencil, and calculators.
- The learner will be able to create and apply strategies for computations with whole numbers, emphasizing addition and subtraction.
- The learner will be able to apply physical, pictorial, and verbal illustrations in order to develop an understanding of invented and conventional symbolic notations.
- The learner will be able to determine the number sentence depicted in a picture.
- The learner will be able to understand the meaning of addition and subtraction of whole numbers.
- The learner will be able to comprehend the relationships between addition and subtraction.
- The learner will be able to comprehend the relationships among operations.
- The learner will be able to represent the general principles of operations using specific numbers.

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- The learner will be able to represent the general properties of operations using specific numbers.
- The learner will be able to compute fluently.
- The learner will be able to identify "how many" in a set of objects.

Data Interpretation

The Data Interpretation Unit includes Competencies/Objectives which focus on the study and use of graphical forms. Students collect and classify data, organize and display data, use logical reasoning, and problem solving.

- The learner will be able to plot data on a bar graph that already has a scale and axis labels.

Fractions

The Fractions Unit includes Competencies/Objectives which focus on number sense and operations with fractions. Students compare and order fractions, study fraction parts, estimate with fractions, reason using fractions, and problem solve using fractions.

- The learner will be able to identify parts of a whole (including $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$).
- The learner will be able to illustrate commonly used fractions.

Geometry

The Geometry Unit includes Competencies/Objectives which focus on exploring geometric concepts from multiple perspectives. Students study properties and construction of figures, proofs and theorems, history of geometry, transformations, logic, and problem solving.

- The learner will be able to identify geometric shapes and structures in the environment and name their location.
- The learner will be able to identify size, shape, and/or position relationships among various objects.

- The learner will be able to relate geometry to associated topics in measurement and number.
- The learner will be able to explain, name, and interpret relative positions in space and use concepts about relative position.
- The learner will be able to specify locations and explain spatial relationships by applying coordinate geometry and various other representational systems.
- The learner will be able to explore and predict combining and taking apart two- and three-dimensional figures.
- The learner will be able to identify an object based on an oral description.
- The learner will be able to represent shapes from various perspectives.
- The learner will be able to recognize three-dimensional solids.
- The learner will be able to name three-dimensional solids.
- The learner will be able to explain the parts of three-dimensional solids.
- The learner will be able to explain the characteristics of three-dimensional solids.
- The learner will be able to compare characteristics of three-dimensional solids.
- The learner will be able to sort three-dimensional solids by various characteristics.
- The learner will be able to study the characteristics of three-dimensional solids.
- The learner will be able to identify two-dimensional figures.
- The learner will be able to name two-dimensional shapes.
- The learner will be able to explain the characteristics of two-dimensional shapes.

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- The learner will be able to explain the parts of two-dimensional shapes.
- The learner will be able to create drawings of two-dimensional shapes.
- The learner will be able to sort two-dimensional figures based on their characteristics.
- The learner will be able to compare characteristics of two-dimensional figures.
- The learner will be able to study the characteristics of two-dimensional shapes.
- The learner will be able to study the properties of two-dimensional shapes.
- The learner will be able to construct two-dimensional shapes.
- The learner will be able to identify a reflection of a geometric figure.
- The learner will be able to identify a rotation of a geometric figure.
- The learner will be able to identify shapes that have symmetry.
- The learner will be able to create symmetrical shapes.
- The learner will be able to study and evaluate the mathematical thought processes and strategies of others.
- The learner will be able to create and evaluate mathematical arguments and proofs.
- The learner will be able to identify reasoning and proof as fundamental aspects of mathematics.
- The learner will be able to create new mathematical knowledge through the problem solving process.
- The learner will be able to make mathematical representations for organizing, recording, and explaining mathematical concepts.
- The learner will be able to apply a variety of mathematical representations for organizing, recording, and explaining mathematical concepts.
- The learner will be able to apply representations to illustrate and interpret physical, social and mathematical scenarios.
- The learner will be able to identify mathematics in contexts outside of mathematics.
- The learner will be able to organize their mathematical thought processes through communication.
- The learner will be able to use mathematics in contexts outside of mathematics.
- The learner will be able to choose various types of reasoning strategies.
- The learner will be able to use many different reasoning strategies.
- The learner will be able to state mathematical ideas clearly using mathematical language.
- The learner will be able to identify connections among mathematical concepts.
- The learner will be able to apply connections among mathematical concepts.

Mathematics Processes

The Mathematics Processes Unit includes Competencies/Objectives which focus on mathematical connections. Students communicate and model concepts and procedures.

- The learner will be able to integrate their mathematical thought processes through communication.
- The learner will be able to express mathematical thought processes in an understandable and precise way to peers, teachers, and others.
- The learner will be able to comprehend how mathematical concepts interconnect and build on one another to create a coherent whole.

Measurement

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The Measurement Unit includes Competencies/Objectives which focus on measurement concepts, applications, and analysis. Students study length, area, circumference, perimeter, volume, weight, formulas, distance, calendar, money, tools, accuracy, units, constructions, patterns, and problem solving.

- The learner will be able to comprehend the measurable characteristics of objects and the units, systems, and processes of measurement.
- The learner will be able to compare and order objects according to a measurable attribute of the object.
- The learner will be able to explain, name, and interpret direction and distance in navigating space and use concepts about direction and distance.
- The learner will be able to use various methods to determine measurements.
- The learner will be able to comprehend how to use nonstandard units to measure.
- The learner will be able to comprehend how to use standard units to measure.
- The learner will be able to perform measurements using multiple copies of units of the same size.
- The learner will be able to apply the repetition of a single unit in order to measure something larger than the unit.
- The learner will be able to choose a suitable unit of measure for a given attribute of an object.
- The learner will be able to identify the day of the week, the month, and the year by reading a calendar.
- The learner will be able to identify chronological sequence within calendar time.
- The learner will be able to convert time between weeks and days.
- The learner will be able to identify the characteristics of length.

- The learner will be able to accurately read the appropriate scale on a ruler.
- The learner will be able to identify the characteristics of time.
- The learner will be able to tell time to the nearest quarter hour.
- The learner will be able to determine correct number of coins needed to purchase an item.
- The learner will be able to determine an equivalent value of money given a specific amount.
- The learner will be able to compare temperatures using terms such as warmer than, cooler than, etc.
- The learner will be able to identify the characteristics of area.
- The learner will be able to identify the characteristics of weight.
- The learner will be able to identify the characteristics of volume.
- The learner will be able to create common referents for measures in order to make comparisons.
- The learner will be able to create common referents for measures in order to make estimates.
- The learner will be able to use various formulas to determine measurements.
- The learner will be able to use various tools for determining measurements.
- The learner will be able to choose a suitable tool to measure a given attribute of an object.

Number Theory

The Number Theory Unit includes Competencies/Objectives which focus on manipulating number forms and classifications. Students make connections between number forms and their real world applications.

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- The learner will be able to connect number words and numbers to the quantities they represent by applying many different concrete models and representations.
- The learner will be able to sort, classify, and order objects according to size, number, and various properties.
- The learner will be able to illustrate and analyze mathematical situations and structures by applying algebraic symbols.
- The learner will be able to identify number for a word name read orally; numbers are less than fifty.
- The learner will be able to identify equivalent values of numbers written with irregularly grouped units, such as 16 tens and 11 ones being equal to 171.
- The learner will be able to determine the place value of a number in the tens place.
- The learner will be able to use many different models in order to begin to understand place value.
- The learner will be able to identify odd and even numbers up to 20.
- The learner will be able to understand number relationships.
- The learner will be able to understand the various ways of representing numbers.
- The learner will be able to comprehend number systems.
- The learner will be able to use many different models in order to begin to understand the base-ten number system.
- The learner will be able to identify, explain, and continue patterns and translate from one representation to another representation.
- The learner will be able to develop a comprehension of the relative position and magnitude of whole numbers and of ordinal and cardinal numbers and their connections.
- The learner will be able to estimate subtraction problems using whole numbers.
- The learner will be able to comprehend quantitative relationships using mathematical models.
- The learner will be able to illustrate quantitative relationships using mathematical models.
- The learner will be able to determine which of two numbers is greater than or less than the other.
- The learner will be able to identify the word name for a missing number in a given counting series.
- The learner will be able to perform counting with understanding.
- The learner will be able to comprehend patterns.
- The learner will be able to order numbers from 1 to 100.
- The learner will be able to estimate sums of whole numbers.
- The learner will be able to explain qualitative change.
- The learner will be able to explain quantitative change.
- The learner will be able to analyze change in many different contexts.
- The learner will be able to apply estimation to obtain reasonable approximations.
- The learner will be able to round whole numbers to the nearest ten.
- The learner will be able to comprehend numbers.

Numeration

The Numeration Unit includes Competencies/Objectives which focus on exploring ordinality, identifying and extending number patterns, comparing numbers, and demonstrating number relationships.

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- The learner will be able to study how repeating patterns are created.
- The learner will be able to study how growing patterns are created.

Probability/Statistics

The Probability/Statistics Unit includes Competencies/Objectives which focus on data analysis and probability concepts. Students collect, analyze, and make sense of real world data (including overlapping data, inconclusive data, etc.).

- The learner will be able to create questions and gather, organize, and illustrate data to answer those questions.
- The learner will be able to sort and classify objects based upon their characteristics and organize data about the objects.
- The learner will be able to explain parts of data and data as a whole in order to determine what the data illustrate.
- The learner will be able to pose questions and collect data about themselves and their environment.
- The learner will be able to comprehend the basic concept of probability.
- The learner will be able to use the basic concepts of probability.
- The learner will be able to use a graph to represent a group of data.
- The learner will be able to describe events associated with students' experiences as likely or unlikely.
- The learner will be able to make predictions based on a given set of data.
- The learner will be able to choose suitable statistical methods to analyze data.
- The learner will be able to apply suitable statistical methods to analyze data.

- The learner will be able to formulate inferences and/or predictions for data.
- The learner will be able to evaluate inferences from data.
- The learner will be able to use physical objects to represent data.
- The learner will be able to use pictures to represent data.

Problem Solving

The Problem Solving Unit includes Competencies/Objectives which focus on analyzing problems, evaluating solutions, exploring problems, and developing strategies for solving problems.

- The learner will be able to choose, use, and translate among mathematical representations to obtain solutions to problems.
- The learner will be able to adapt many different appropriate strategies in order to obtain problem solutions.
- The learner will be able to apply a variety of strategies to obtain problem solutions.
- The learner will be able to solve mathematical problems.
- The learner will be able to obtain solutions to problems that arise in contexts outside of mathematics.
- The learner will be able to reflect on the processes applied to solve a problem.
- The learner will be able to monitor the processes applied to obtain solutions to mathematical problems.

Whole Numbers

The Whole Numbers Unit includes Competencies/Objectives which focus on whole number concepts. Students perform operations with whole numbers, use manipulatives to demonstrate whole number concepts, and solve problems with whole numbers in real world contexts.

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- The learner will be able to develop whole number sense and represent and apply whole numbers in flexible ways, including relating, composing, and decomposing numbers.
- The learner will be able to add 1 - 2 digit whole numbers with regrouping.
- The learner will be able to subtract two whole numbers with 2-digits both horizontally and vertically; no regrouping required.
- The learner will be able to comprehend the effects of adding and subtracting whole numbers.
- The learner will be able to use concrete objects, pictures, and/or symbols to represent addition and subtraction with whole numbers.
- The learner will be able to develop fluency with basic addition and subtraction number combinations.
- The learner will be able to comprehend situations that involve multiplying and dividing.
- The learner will be able to understand the meaning of operations.