

# Math, Grade K (IMRA)

Subject: Mathematics

Grade: KG

Expectations: 36

Breakouts: 127

## (a) Introduction.

1. The desire to achieve educational excellence is the driving force behind the Texas essential knowledge and skills for mathematics, guided by the college and career readiness standards. By embedding statistics, probability, and finance, while focusing on computational thinking, mathematical fluency, and solid understanding, Texas will lead the way in mathematics education and prepare all Texas students for the challenges they will face in the 21st century.
2. The process standards describe ways in which students are expected to engage in the content. The placement of the process standards at the beginning of the knowledge and skills listed for each grade and course is intentional. The process standards weave the other knowledge and skills together so that students may be successful problem solvers and use mathematics efficiently and effectively in daily life. The process standards are integrated at every grade level and course. When possible, students will apply mathematics to problems arising in everyday life, society, and the workplace. Students will use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution. Students will select appropriate tools such as real objects, manipulatives, algorithms, paper and pencil, and technology and techniques such as mental math, estimation, number sense, and generalization and abstraction to solve problems. Students will effectively communicate mathematical ideas, reasoning, and their implications using multiple representations such as symbols, diagrams, graphs, computer programs, and language. Students will use mathematical relationships to generate solutions and make connections and predictions. Students will analyze mathematical relationships to connect and communicate mathematical ideas. Students will display, explain, or justify mathematical ideas and arguments using precise mathematical language in written or oral communication.
3. For students to become fluent in mathematics, students must develop a robust sense of number. The National Research Council's report, "Adding It Up," defines procedural fluency as "skill in carrying out procedures flexibly, accurately, efficiently, and appropriately." As students develop procedural fluency, they must also realize that true problem solving may take time, effort, and perseverance. Students in Kindergarten are expected to perform their work without the use of calculators.
4. The primary focal areas in Kindergarten are understanding counting and cardinality, understanding addition as joining and subtraction as separating, and comparing objects by measurable attributes.
  - a. Students develop number and operations through several fundamental concepts. Students know number names and the counting sequence. Counting and cardinality lay a solid foundation for number. Students apply the principles of counting to make the connection between numbers and quantities.
  - b. Students use meanings of numbers to create strategies for solving problems and responding to practical situations involving addition and subtraction.
  - c. Students identify characteristics of objects that can be measured and directly compare objects according to these measurable attributes.
5. Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

## (b) Knowledge and Skills Statements

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
- (A) apply mathematics to problems arising in everyday life, society, and the workplace
    - (i) apply mathematics to problems arising in everyday life
    - (ii) apply mathematics to problems arising in society
    - (iii) apply mathematics to problems arising in the workplace
  - (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
    - (i) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process
    - (ii) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the reasonableness of the solution
  - (C) select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;
    - (i) select tools, including real objects as appropriate, to solve problems
    - (ii) select tools, including manipulatives as appropriate, to solve problems
    - (iii) select tools, including paper and pencil as appropriate, to solve problems
    - (iv) select tools, including technology as appropriate, to solve problems
    - (v) select techniques, including mental math as appropriate, to solve problems
    - (vi) select techniques, including estimation as appropriate, to solve problems
    - (vii) select techniques, including number sense as appropriate, to solve problems
  - (D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;
    - (i) communicate mathematical ideas using multiple representations, including symbols as appropriate
    - (ii) communicate mathematical ideas using multiple representations, including diagrams as appropriate
    - (iii) communicate mathematical ideas using multiple representations, including graphs as appropriate
    - (iv) communicate mathematical ideas using multiple representations

(xi) communicate [mathematical ideas'] implications using multiple representations, including graphs as



- (ii) decompose numbers up to 10 with objects
  - (iii) compose numbers up to 10 with pictures
  - (iv) decompose numbers up to 10 with pictures
- (3) Number and operations. The student applies mathematical process standards to develop an understanding of addition and subtraction situations in order to solve problems. The student is expected to:
- (A) model the action of joining to represent addition and the action of separating to represent subtraction;
    - (i) model the action of joining to represent addition
    - (ii) model the action of separating to represent subtraction
  - (B) solve word problems using objects and drawings to find sums up to 10 and differences within 10; and
    - (i) solve word problems using objects to find sums up to 10
    - (ii)

- (ii) recite numbers up to at least 100 by tens beginning with any given number
- (6) Geometry and measurement. The student applies mathematical process standards to analyze attributes of two-dimensional shapes and three-dimensional solids to develop generalizations about their properties. The student is expected to:
- (A) identify two-dimensional shapes, including circles, triangles, rectangles, and squares as special rectangles;
    - (i) identify two-dimensional shapes, including circles
    - (ii) identify two-dimensional shapes, including triangles
    - (iii) identify two-dimensional shapes, including rectangles
    - (iv) identify two-dimensional shapes, including squares as special rectangles
  - (B) identify three-dimensional solids, including cylinders, cones, spheres, and cubes, in the real world;
    - (i) identify three-dimensional solids, including cylinders, in the real world
    - (ii) identify three-dimensional solids, including cones, in the real world
    - (iii) identify three-dimensional solids, including spheres in the real world
    - (iv) identify three-dimensional solids, including cubes, in the real world
  - (C) identify two-dimensional components of three-dimensional objects;
    - (i) identify two-dimensional components of three-dimensional objects
  - (D) identify attributes of two-dimensional shapes using informal and formal geometric language interchangeably;
    - (i) identify attributes of two-dimensional shapes using informal and formal geometric language interchangeably
  - (E) classify and sort a variety of regular and irregular two- and three-dimensional figures regardless of orientation or size; and
    - (i) classify a variety of regular two-dimensional figures regardless of orientation or size
    - (ii) classify a variety of regular three-dimensional figures regardless of orientation or size
    - (iii) classify a variety of irregular two-dimensional figures regardless of orientation or size
    - (iv) classify a variety of irregular three-dimensional figures regardless of orientation or size
    - (v) sort a variety of regular two-dimensional figures regardless of orientation or size
    - (vi) sort a variety of regular three-dimensional figures regardless of orientation or size
    - (vii) sort a variety of irregular two-dimensional figures regardless of orientation or size
    - (viii) sort a variety of irregular three-dimensional figures regardless of orientation or size
  - (F) create two-dimensional shapes using a variety of materials and drawings.
    - (i) create two-dimensional shapes using a variety of materials
    - (ii) create two-dimensional shapes using drawings
- (7) Geometry and measurement. The student applies mathematical process standards to directly compare measurable attributes. The student is expected to:
- (A) give an example of a measurable attribute of a given object, including length, capacity, and weight; and

- (i) give an example of a measurable attribute of a given object, including length
- (ii) give an example of a measurable attribute of a given object, including capacity
- (iii) give an example of a measurable attribute of a given object, including weight

(B) compare two objects with a common measurable attribute to see which object has more of/less of the attribute and describe the difference.

- (i) compare two objects with a common measurable attribute to see which object has more of/less of the attribute
- (ii) compare two objects with a common measurable attribute and describe the difference

(8) Data analysis. The student applies mathematical process standards to collect and organize data to make it useful for interpreting information. The student is expected to:

(A) collect, sort, and organize data into two or three categories;

- (i) collect data