STAAR
FIELD GUIDE
FOR TEACHERS

K

KINDERGARTEN MATH

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STAAR

The State of Texas of Assessment of Academic Readiness (STAAR) is based on the Texas Essential Knowledge and Skills (TEKS). Most of the state standards, if they are eligible for assessment in a multiple choice/short answer format, will be assessed on STAAR.

STAAR is designed as a **vertical** system. Just as the TEKS are structured in a vertically aligned manner, so is STAAR. Learning from one grade level is aligned with learning at the next grade level. Some skills are developed over the course of a student's educational career from kindergarten through high school, while other skills and learning may begin at a particular grade level and serve as the foundation for later learning. STAAR is an assessment of **academic** readiness.

STAAR is designed to ensure that teachers answer these questions:

- Did students learn what they were supposed to learn in the current year's grade?
- Are students ready for the next grade?
- And are they also ready for the grade after that?

So what's the big deal about that shift? Fundamentally, it requires that teachers relook at curriculum and instruction in a very different way than they have under previous assessment systems (TABS, TEAMS, TAAS, TAKS). Not only are teachers required to have a deep understanding of the content of the grade level they are teaching, but they must also be firmly grounded in how the content of that current grade level prepares students for subsequent grade levels. Overemphasis on grade level attainment ONLY may create a context where teachers in subsequent grade levels have to reteach foundational skills to accommodate for the gap created by the lack of appropriate emphasis earlier. It may require students to "unlearn" previous ways of conceptualizing content and essentially start all over.

STAAR: focus, clarity, depth

[The TEKS] are designed to prepare students to succeed in college, in careers and to compete globally. However, consistent with a growing national consensus regarding the need to provide a more clearly articulated K 16 education program that focuses on fewer skills and addresses those skills in a deeper manner, TEA has further refined the TEKS organization as follows.

STAAR is designed around three concepts: focus, clarity, and depth:

Focus: STAAR will focus on grade level standards that are critical for that grade level and the ones to follow

Clarity: STAAR will assess the eligible TEKS at a level of specificity that allow students to demonstrate mastery

Depth: STAAR will assess the eligible TEKS at a higher cognitive level and in novel contexts

STAAR: the assessed curriculum – readiness, supporting, and process standards

A key concept that underpins the design of STAAR is that all standards (TEKS) do not play the same role in student learning. Simply stated, some standards (TEKS) have greater priority than others - they are so vital to the current grade level or content area that they must be learned to a level of mastery to ensure readiness (success) in the next grade levels. Other standards are important in helping to support learning, to maintain a previously learned standard, or to prepare students for a more complex standard taught at a later grade.

By assessing the TEKS that are most critical to the content area in more rigorous ways, STAAR will better measure the academic performance of students as they progress from elementary to middle to high school. Based on educator committee recommendations, for each grade level or course, TEA has identified a set of readiness standards - the TEKS which help students develop deep and enduring understanding of the concepts in each content area. The remaining knowledge and skills are considered supporting standards and will be assessed less frequently, but still play a very important role in learning.

Readiness standards have the following characteristics:

- They are essential for success in the current grade or course.
- They are important for preparedness for the next grade or course.
- They support college and career readiness.
- They necessitate in-depth instruction.
- They address broad and deep ideas.

Supporting standards have the following characteristics:

- Although introduced in the current grade or course, they may be emphasized in a subsequent year.
- Although reinforced in the current grade or course, they may be emphasized in a previous year.
- They play a role in preparing students for the next grade or course but not a central role.
- They address more narrowly defined ideas.

STAAR assesses the eligible TEKS at the level at which the TEKS were written.

STAAR is a more rigorous assessment than TAKS (and TAAS, TEAMS, TABS before that). The level of rigor is connected with the cognitive level identified in the TEKS themselves. Simply stated, STAAR will measure the eligible TEKS at the level at which they are written.

The rigor of items will be increased by

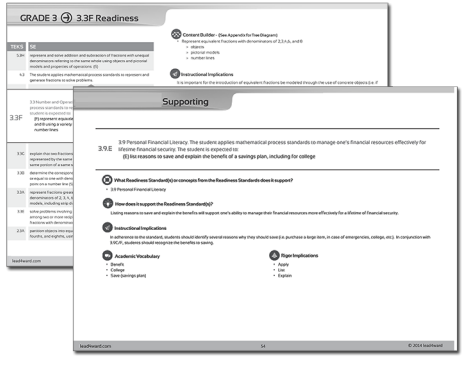
- assessing content and skills at a greater depth and higher level of cognitive complexity
- assessing more than one student expectation in a test item

The rigor of the tests will be increased by

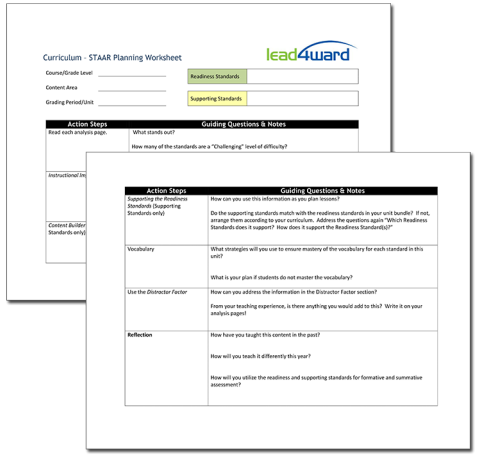
- assessing fewer, yet more focused, student expectations and assessing them multiple times and in more complex ways
- including a greater number of rigorous items on the test, thereby increasing the overall test difficulty

About the STAAR Field Guide for Teachers

The STAAR Field Guide for Teachers is designed as a tool to help teachers prepare for instruction. The tools and resources in this guide are designed to supplement local curriculum documents by helping teachers understand how the design and components of STAAR are connected to the scope and sequence of instruction. In order to help students attain even higher levels of learning as assessed on STAAR, teachers need to plan for increasing levels of rigor. This guide contains the following components:



STAAR Readiness and Supporting Standards Analysis Sheets - overviews of the nature of each readiness and supporting standard assessed on STAAR, designed to be used in planning to build teacher content knowledge and ensure that current grade level instruction reinforces previous learning and prepares students for future grade levels.



STAAR-Curriculum Planning Worksheet - a tool to organize the pages in this guide to be used in planning and professional development.

Steps to Success

1. Download the TEA Documents to add to your STAAR Teacher Field Guide
   - » STAAR Blueprint
   - » Assessed Curriculum Documents
   - » STAAR Test Design
   - » STAAR Reference Materials

2. Visit lead4ward.com/resources to download lead4ward resource materials to add to your STAAR Field Guide
   - » STAAR Snapshot
   - » TEKS Scaffold Documents
   - » IQ Released Tests
   - » Student Recording Sheets

3. Review the STAAR Snapshot for your course/grade level and content area
   - » Note the readiness standards
   - » With your team, explore why those TEKS are classified as readiness standards - and which criteria they meet
   - » Review the supporting standards and note any that may have played a larger role on TAKS

4. Review the components of the STAAR Readiness and Supporting Standards Analysis Sheets
   - » Use the samples on pages 6 and 7 to explore the analysis sheets
   - » Add additional information based on the discussion of the team

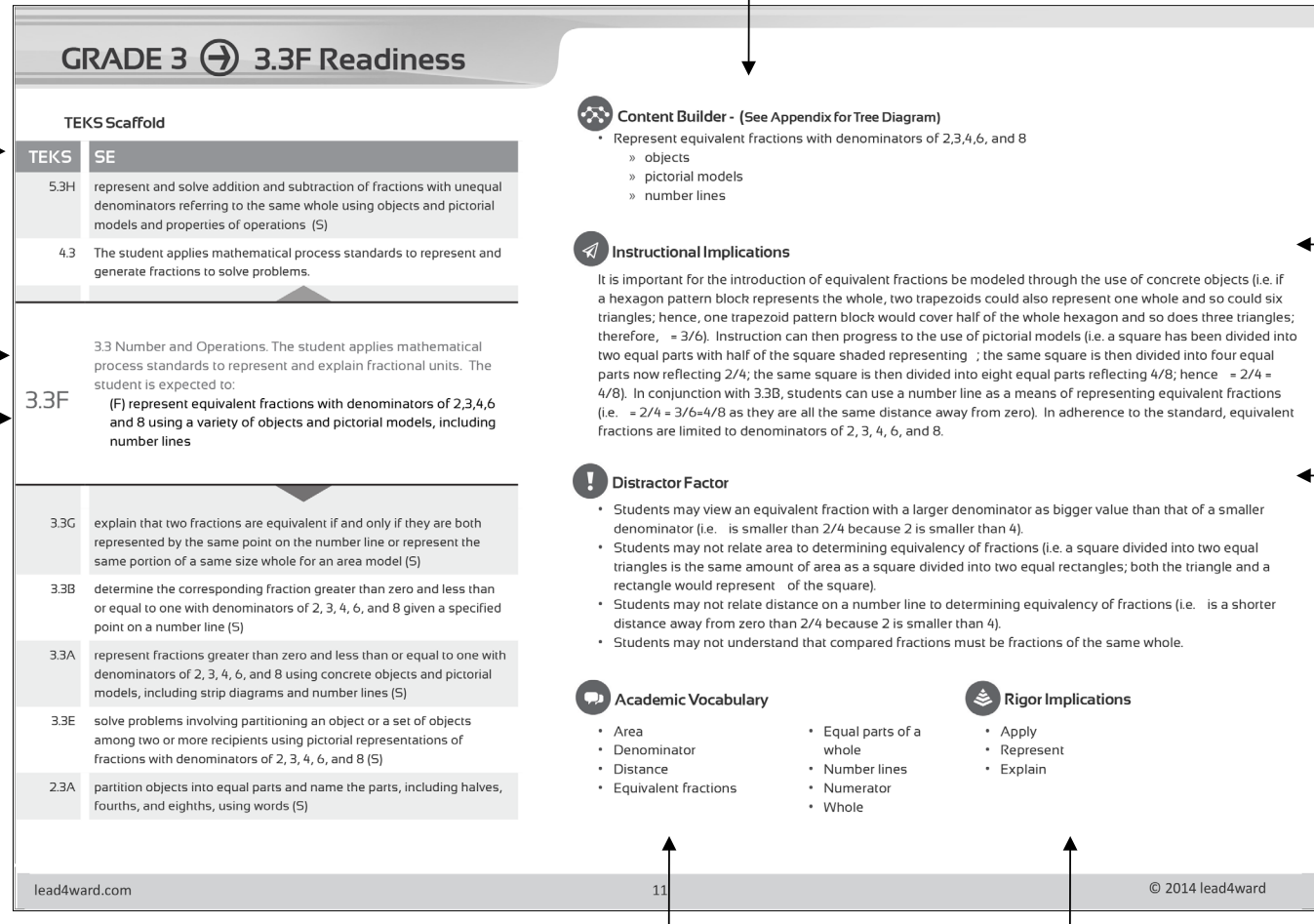
5. Create STAAR-Curriculum Planning Packets for each unit or grading period
   - » Collect either the Scope and Sequence document (if it includes the TEKS standards for each unit of instruction) OR Unit Plan documents (where the TEKS standards are bundled together into units of instruction)
   - » The STAAR Field Guide is arranged by standard type (readiness or supporting) in numeric order of the standards. You may need to photocopy certain pages/standards if they are repeated throughout multiple units
   - » Use the scope and sequence or unit plan documents to identify the TEKS taught in each unit/grading period
   - » Compile the STAAR Readiness and Supporting Standards Analysis Sheets that correspond to the TEKS in each unit/grading period
   - » After the pages/standards are sorted into their appropriate unit, create a method of organizing the documents (binder, folder, file, etc.).

6. Plan for instruction
   - » Collect the curriculum documents used for planning
   - » Use the STAAR - Curriculum Planning Worksheet as you plan each unit. The worksheet provides guiding questions and reflection opportunities to aid you in maximizing the material in the STAAR Field Guide
   - » Determine where the team needs additional learning
   - » Evaluate instructional materials
   - » Review the plan for appropriate levels of rigor

How to read STAAR Readiness Standards Analysis Pages

Standard and Indication
of "Readiness" or "Supporting"

Content Builder
The basics of the content within the standard are extracted in a bulleted list. Describes multiple measurable parts in a standard - used to select and vary instructional materials.



GRADE 3 → 3.3F Readiness

TEKS Scaffold

TEKS Scaffold

TEKS	SE
5.3H	represent and solve addition and subtraction of fractions with unequal denominators referring to the same whole using objects and pictorial models and properties of operations (S)
4.3	The student applies mathematical process standards to represent and generate fractions to solve problems.
	3.3 Number and Operations. The student applies mathematical process standards to represent and explain fractional units. The student is expected to:
3.3F	(F) represent equivalent fractions with denominators of 2,3,4,6 and 8 using a variety of objects and pictorial models, including number lines
3.3G	explain that two fractions are equivalent if and only if they are both represented by the same point on the number line or represent the same portion of a same size whole for an area model (S)
3.3B	determine the corresponding fraction greater than zero and less than or equal to one with denominators of 2, 3, 4, 6, and 8 given a specified point on a number line (S)
3.3A	represent fractions greater than zero and less than or equal to one with denominators of 2, 3, 4, 6, and 8 using concrete objects and pictorial models, including strip diagrams and number lines (S)
3.3E	solve problems involving partitioning an object or a set of objects among two or more recipients using pictorial representations of fractions with denominators of 2, 3, 4, 6, and 8 (S)
2.3A	partition objects into equal parts and name the parts, including halves, fourths, and eighths, using words (S)

Content Builder - (See Appendix for Tree Diagram)
- Represent equivalent fractions with denominators of 2,3,4,6, and 8
  - » objects
  - » pictorial models
  - » number lines

Instructional Implications
It is important for the introduction of equivalent fractions be modeled through the use of concrete objects (i.e. if a hexagon pattern block represents the whole, two trapezoids could also represent one whole and so could six triangles; hence, one trapezoid pattern block would cover half of the whole hexagon and so does three triangles; therefore, = 3/6). Instruction can then progress to the use of pictorial models (i.e. a square has been divided into two equal parts with half of the square shaded representing ; the same square is then divided into four equal parts now reflecting 2/4; the same square is then divided into eight equal parts reflecting 4/8; hence = 2/4 = 4/8). In conjunction with 3.3B, students can use a number line as a means of representing equivalent fractions (i.e. = 2/4 = 3/6=4/8 as they are all the same distance away from zero). In adherence to the standard, equivalent fractions are limited to denominators of 2, 3, 4, 6, and 8.

Distractor Factor
- Students may view an equivalent fraction with a larger denominator as bigger value than that of a smaller denominator (i.e. is smaller than 2/4 because 2 is smaller than 4).
- Students may not relate area to determining equivalency of fractions (i.e. a square divided into two equal triangles is the same amount of area as a square divided into two equal rectangles; both the triangle and a rectangle would represent of the square).
- Students may not relate distance on a number line to determining equivalency of fractions (i.e. is a shorter distance away from zero than 2/4 because 2 is smaller than 4).
- Students may not understand that compared fractions must be fractions of the same whole.

Academic Vocabulary
- Area
- Denominator
- Distance
- Equivalent fractions
- Equal parts of a whole
- Number lines
- Numerator
- Whole

Rigor Implications
- Apply
- Represent
- Explain

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Texas Essential Knowledge and Skills Statement

Student Expectation

Instructional Implication
Suggestions to modify instruction that support effectively teaching this standard.

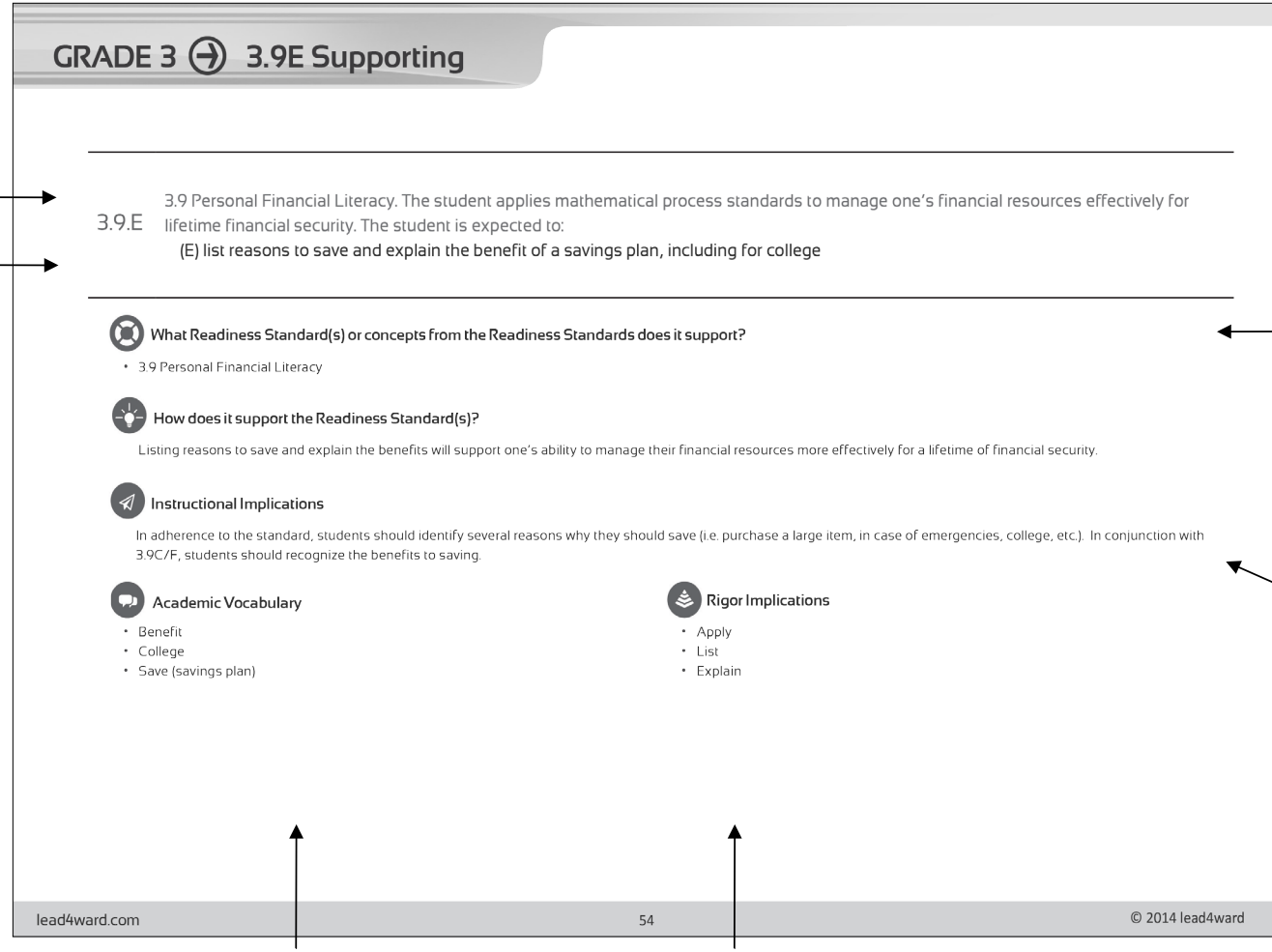
Distractor Factor
Alerts teachers to areas where students traditionally struggle, have misconceptions, or may need reinforcement. Common errors in learning.

Academic Vocabulary
Vocabulary words extracted directly from the standard and/or associated with the instruction of the content within the standard.

Rigor Implications
Uses the verb(s) from the Student Expectation to indicate the cognitive complexity of the standard.

How to read STAAR Supporting Standards Analysis Pages

Standard and Indication of "Readiness" or "Supporting"



Texas Essential Knowledge and Skills Statement

Student Expectation

Supporting the Readiness Standards - Most supporting standards support a readiness standard in the current grade level. This section discusses the relationships of the standards that are often taught together.

Instructional Implication
Suggestions to modify instruction that support effectively teaching this standard.

Academic Vocabulary
Vocabulary words extracted directly from the standard and/or associated with the instruction of the content within the standard.

Rigor Implications
Uses the verb(s) from the Student Expectation to indicate the cognitive complexity of the standard.

Curriculum - STAAR Planning Worksheet

Course/Grade Level _____

Content Area _____

Grading Period/Unit _____

Readiness Standards	

Supporting Standards	

Action Steps	Guiding Questions & Notes
Read each analysis page.	What stands out? Do you have data on any of the standards that suggest whether the standard is a strength or a concern? How many of the standards are at a high level of rigor?
Instructional Implications	How will these implications inform your planning? How can you use this information to modify instruction?
TEKS Scaffolding	What concepts did students learn in the previous grade to prepare them? Do you have students who may struggle with those concepts? Look at how the students will use that concept in subsequent grades - will the way you teach it still apply in those grades?

Curriculum - STAAR Planning Worksheet (continued)

Action Steps	Guiding Questions & Notes
Content Builder (Readiness Standards only)	How many parts does this standard have? Which of the parts are new to your team or to the students? This content is important for students' future learning. How will you assess retention?
Supporting the Readiness Standards (Supporting Standards only)	How can you use this information as you plan lessons? Do the supporting standards match with the readiness standards in your unit bundle? If not, arrange them according to your curriculum. Address the questions again: "Which Readiness Standards does it support? How does it support the Readiness Standard(s)?"
Vocabulary	What strategies will you use to ensure mastery of the vocabulary for each standard in this unit? What is your plan if students do not master the vocabulary?
Use the *Distractor Factor*	How can you address the information in the Distractor Factor section? From your teaching experience, is there anything you would add to this? Write it on your analysis pages!
Reflection	How have you taught this content in the past? How will you teach it differently this year? How will you utilize the readiness and supporting standards for formative and summative assessment?

TEKS Scaffold

TEKS	SE
3.2A	compose and decompose numbers up to 100,000 as a sum of so many ten thousands, so many thousands, so many hundreds, so many tens, and so many ones using objects, pictorial models, and numbers, including expanded notation as appropriate (R)
2.2B	use standard, word, and expanded forms to represent numbers up to 1,200 (R)
2.2A	use concrete and pictorial models to compose and decompose numbers up to 1,200 in more than one way as a sum of so many thousands, hundreds, tens, and ones (S)
1.2C	use objects, pictures, and expanded and standard forms to represent numbers up to 120 (R)
1.2B	use concrete and pictorial models to compose and decompose numbers up to 120 in more than one way as so many hundreds, so many tens, and so many ones (S)
K.2B	**K.2 Number and Operations.** The student applies mathematical process standards to understand how to represent and compare whole numbers, the relative position and magnitude of whole numbers, and relationships within the numerations system. The student is expected to: (B) read, write, and represent whole numbers from 0 to at least 20 with and without objects or pictures
K.2I	compose and decompose numbers up to 10 with objects and pictures (R)

Content Builder - (See Appendix for Tree Diagram)

- Read whole numbers through 20
- Write whole numbers through 20
- Represent whole numbers through 20
  - » with and without objects/pictures

Instructional Implications

Helping students read and write numerals is similar to teaching them to read and write letters of the alphabet. Instruction often involves engaging forms of repetition (i.e. making numerals out of clay, tracing numerals in shaving cream, representing numerals on the calculator, matching games, etc.). While students are developing the writing of numerals, they can select from a stack of pre-made number cards to read and represent the total number of objects in a set. Students must also be given a whole number and asked to represent the quantities with given objects/manipulatives.

Distractor Factor

- Students may write numerals backwards but understand the value of the number.
- Students may be able to read a number but not represent its value.
- Students may be able to read a number but not write the number.
- Students may confuse the value of a number and the representation of a number.
- Students may be able to write a number but not associate a set of objects to its value.
- Students may be able to represent a number with a set of objects but not be able to identify and/or write the numeric representation.
- Students may recite the numbers, such as 1 through 10 or 1 through 20, without associating the number name with the appropriate number or value.
- Students may confuse number names that are homophones (one/won, two/to/too, four/for, eight/ate).
- Students may not consider zero a number.

Academic Vocabulary

- Numbers 1-20 (oral and written representations)

Rigor Implications

- Apply
- Understand
- Represent
- Compare
- Read
- Write

TEKS Scaffold

TEKS	SE
3.3D	compose and decompose a fraction a/b with a numerator greater than zero and less than or equal to b as a sum of parts 1/b (S)
2.2D	use place value to compare and order whole numbers up to 1,200 using comparative language, numbers, and symbols (<,>, or =) (R)
1.2G	represent the comparison of two numbers to 100 using the symbols >,<,or = (R)
1.2F	order whole numbers up to 120 using place value and open number lines (S)
1.2E	use place value to compare whole numbers up to 120 using comparative language (S)
K.2H	**K.2 Number and Operations.** The student applies mathematical process standards to understand how to represent and compare whole numbers, the relative position and magnitude of whole numbers, and relationships within the numerations system. The student is expected to: (H) use comparative language to describe two numbers up to 20 presented as written numerals
K.2G	compare sets of objects up to at least 20 in each set using comparative language (S)

Content Builder - (See Appendix for Tree Diagram)

- Use comparative language to describe whole numbers up to 20

Instructional Implications

As students become comfortable using manipulatives to compare values (see K.2G), instruction should then move to the abstract where students are just given a written numeral (without an image/object) and asked to compare it to another written numeral. Encourage students to give two statements to describe each comparison (i.e. 9 is more than 6 and 6 is less than 9).

Distractor Factor

- Due to developmental reasons, students may not be able to compare written representation of numerals.
- Students may view a comparison statement and its inverse as two different comparison statements (i.e. nine is greater than six; six is less than nine).

Academic Vocabulary

- Equal to
- Greater than
- Less than
- More than

Rigor Implications

- Apply
- Understand
- Represent
- Compare
- Use
- Describe

TEKS Scaffold

TEKS	SE
3.4A	solve with fluency one-step and two-step problems involving addition and subtraction within 1,000 using strategies based on place value, properties of operations, and the relationship between addition and subtraction (R)
2.4A	recall basic facts to add and subtract within 20 with automaticity (S)
1.3D	apply basic fact strategies to add and subtract within 20, including making 10 and decomposing a number leading to a 10 (S)
1.3C	compose 10 with two or more addends with and without concrete objects (S)
K.2I	**K.2 Number and Operations.** The student applies mathematical process standards to understand how to represent and compare whole numbers, the relative position and magnitude of whole numbers, and relationships within the numerations system. The student is expected to: (I) compose and decompose numbers up to 10 with objects and pictures

Content Builder - (See Appendix for Tree Diagram)

- Compose numbers up to 10
  - » objects
  - » Pictures
- Decompose numbers up to 10
  - » objects
  - » pictures

Instructional Implications

The composing and decomposing of numbers develops a student's understanding of relationships within the numeration system. Instruction may begin with the use of two different colored cubes and asking students to make as many different combinations for four cubes

(i.e. 4 blue; 4 yellow; 3 blue and 1 yellow, three yellow and 1 blue, 2 blue and 2 yellow). Visually representing a given number as many different ways as possible will support students with developing number concepts. Students may begin to informally discover the commutative property (i.e. the total of the train of 3 blue and 1 yellow is the same train as 1 yellow and 3 blue). As students become secure with composing and decomposing sums through 10 with two addends, instruction should extend to the use of three addends. Students will be provided three different color cubes to represent the value of 4 (i.e. 1 red, 2 blue, and 1 yellow; 1 red, 1 blue, 2 yellow; 2 red, 1, blue, 1 yellow).

Distractor Factor

- Students may confuse the creation of patterns (i.e. repeating pattern; blue, yellow, blue, yellow) with the composing/decomposing of numbers (i.e. 1 yellow + 3 blue = a value of 4).

Academic Vocabulary

- Compose
- Decompose

Rigor Implications

- Apply
- Understand
- Represent
- Compare
- Compose
- Decompose

TEKS Scaffold

TEKS	SE
3.4A	solve with fluency one-step and two-step problems involving addition and subtraction within 1,000 using strategies based on place value, properties of operations, and the relationship between addition and subtraction (R)
2.4D	generate and solve problem situations for a given mathematical number sentence involving addition and subtraction of whole numbers within 1,000 (R)
1.3F	generate and solve problem situations when given a number sentence involving addition or subtraction of numbers within 20 (R)
K.3B	**K.3 Number and Operations.** The student applies the mathematical process standards to develop an understanding of addition and subtraction situations in order to solve problems. The student is expected to: (B) solve word problems using objects and drawing to find sums up to 10 and differences within 10

Content Builder - (See Appendix for Tree Diagram)

- Solve addition word problems with sums up to 10 using
  - » objects
  - » drawings
- Solve subtraction word problems with differences within 10 using
  - » objects
  - » drawings

Instructional Implications

In alignment with K.3A, as students will begin modeling the actions of joining and separating. Students should be provided multiple opportunities to solve problems in order to build their understanding of addition and subtraction. The use of drawings and/or objects will be critical for developing the conceptual understanding of joining and separating. It is important that instruction begin with acting out addition/subtraction problems with manipulatives and then associating those actions to a pictorial model. This will support students with moving from the concrete to the abstract.

Distractor Factor

- Students may not recognize a number sentence and its inverse as being equivalent (i.e. 10 - 4 = ___ is the same things as 4 + ___ = 10).

Academic Vocabulary

- Addition (add)
- Difference
- Subtraction (subtract)
- Sum

Rigor Implications

- Apply
- Develop
- Understand
- Solve

TEKS Scaffold

TEKS	SE
3.6A	classify and sort two- and three-dimensional figures, including cones, cylinders, spheres, triangular and rectangular prisms, and cubes, based on attributes using formal geometric language (R)
3.6B	use attributes to recognize rhombuses, parallelograms, trapezoids, rectangles, and squares as examples of quadrilaterals and draw examples of quadrilaterals that do not belong to any of these subcategories (S)
2.8C	classify and sort polygons with 12 or fewer sides according to attributes, including identifying the number of sides and number of vertices (R)
1.6A	classify and sort regular and irregular two-dimensional shapes based on attributes using informal geometric language (R)

K.6E

K.6 Geometry and Measurement. The student applies mathematical process standards to analyze attributes of two-dimensional shapes and three-dimensional solids to develop generalization about their properties. The student is expected to:

(E) classify and sort a variety of regular and irregular two- and three-dimensional figures regardless of orientation or size

Content Builder - (See Appendix for Tree Diagram)

- Classify and sort two-dimensional shapes
  - » circle, triangle, and rectangle (to include squares as special rectangles)
  - » regular and irregular
  - » identification of geometric attributes (i.e. number of sides and number of vertices)
  - » identification of non-geometric attributes (i.e. orientation or size)
- Classify and sort three-dimensional shapes
  - » cylinders, cones, spheres, and cubes
  - » regular and irregular
  - » identification of geometric attributes (i.e. number of edges and vertices; number/types of faces)
  - » identification of non-geometric attributes (i.e. orientation or size)

Instructional Implications

In order to adhere to the standard, students must sort and classify a group of two-dimensional shapes, a group of three-dimensional solids, and a group of two- and three-dimensional figures combined. Orientation, color, or thickness cannot be a geometric attribute for sorting/classifying of these objects. Allowing students to engage in all three types of sorts allows them to focus on what attributes distinguish between a two-dimensional and three-dimensional object in support of K.6C. Students need to be exposed to both regular (i.e. equilateral triangle) and irregular (i.e. right, scalene, isosceles type of triangles) two-dimensional figures.

Distractor Factor

- Students may interchange the term side, referencing two-dimensional shapes, and edge, referencing a three-dimensional shape.
- Students may not view a square as a rectangle.
- Students may confuse the identification of a three-dimensional shape by its two-dimensional attribute (i.e. a cube is mistakenly identified as a square).

Academic Vocabulary

- Attribute
- Irregular
- Polygon
- Regular
- Shape
- Solid
- Three-dimensional
- Two-dimensional

Rigor Implications

- Apply
- Analyze
- Develop
- Classify
- Sort

TEKS Scaffold

TEKS	SE
3.6C	determine the area of rectangles with whole number side lengths in problems using multiplication related to the number of rows times the number of unit squares in each row (R)
3.7B	determine the perimeter of a polygon or a missing length when given perimeter and remaining side lengths in problems (R)
2.9E	determine a solution to a problem involving length, including estimating lengths (R)
2.9B	describe the inverse relationship between the size of the unit and the number of units needed to equal the length of an object (S)
2.9F	use concrete models of square units to find the area of a rectangle by covering it with no gaps or overlaps, counting to find the total number of square units, and describing the measurement using a number and the unit (S)
1.6G	partition two-dimensional figures into two and four fair shares or equal parts and describe the parts using words (S)
1.7C	measure the same object/distance with units of two different lengths and describe how and why the measurement differ (S)
K.7B	**K.7 Geometry and Measurement.** The student applies mathematical process standards to directly compare measureable attributes. The student is expected to: (B) compare two objects with a common measureable attribute to see which object has more of/less of the attribute and describe the difference
K.7A	give an example of a measurable attribute of a given object, including length, capacity, and weight (S)

Content Builder - (See Appendix for Tree Diagram)

- Compare two objects
  - » common measureable attributes
- See (observe)
  - » which object has more of/less of the attribute
- Describe
  - » differences

Instructional Implications

In alignment with K.7A, as students begin identifying a measureable attribute such as length, capacity, or weight instruction can extend to comparing the differences (i.e. comparing the length, capacity, and weight of a trial size cereal box versus a full size cereal box). Instruction is limited to direct comparison (i.e. laying two cereal boxes next to each other to compare length). In alignment with K.2G/H, students should use appropriate comparative language in describing the differences (i.e. the full size cereal box is longer than the trial size cereal box; the full size cereal box holds more than the trial size cereal box; the full size cereal box is heavier than the trial size cereal box). Encourage students to articulate two comparison statements (i.e. the full size cereal box is longer than the trial size cereal box is the same as stating the trial size cereal box is shorter than the full size cereal box).

Distractor Factor

- Students may view a comparison statement and its inverse as two different comparison statements (i.e. the full size cereal box is longer than the trial size cereal box is the same as stating the trial size cereal box is shorter than the full size cereal box).

Academic Vocabulary

- Attribute
- Capacity
- Difference
- Heavier/lighter
- Length
- Longer than/shorter than
- More than/less than
- Weight

Rigor Implications

- Apply
- Compare
- Describe

TEKS Scaffold

TEKS	SE
3.8A	summarize a data se t with multiple categories using a frequency table, dot plot, pictograph, or bar graph with scaled intervals (R)
2.10B	organize a collection of data with up to four categories using pictographs and bar graphs with intervals of one or more (R)
1.8B	use data to create picture and bar-type graphs (R)
1.8A	collect, sort, and organize data in up to three categories using models/ representations such as tally marks or T-charts (S)
K.8B	**K.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: (B) use data to create real-object and picture graphs
K.8A	collect, sort, and organize data into two or three categories (S)

Content Builder - (See Appendix for Tree Diagram)

- Use data to create graphs
  - » real-object
  - » picture graphs

Instructional Implications

In alignment with K.8A, once students have collected and sorted their own data, they will need to represent the data on a real-object graph and/or picture graph. Picture graphs are limited to representing one piece of data (i.e. a smiley face can only represent one person not five). Instruction should emphasize the importance of a title and labeling the categories of the graph. Students should be exposed to both vertical and horizontal graphs.

Distractor Factor

- Due to developmental reasons, students may have difficulty moving from a real-object graph to a picture graph.
- When representing the same set of data vertically and horizontally, students may interpret the data as different because of the difference in the visual representations.
- When using real-objects to represent data, students may associate the larger the object the more data it represents (i.e. two king size candy bars aligned next to four snack size candy bars appears as if there are more king size than snack size candy bars).

Academic Vocabulary

- Data
- Graph
- Title
- Labels
- Picture graphs
- Real-object graphs

Rigor Implications

- Apply
- Collect
- Organize
- Interpret
- Use

TEKS Scaffold

TEKS	SE
3.8B	solve one- and two-step problems using categorical data represented with a frequency table, dot plot, pictograph, or bar graph with scaled intervals (S)
2.10C	write and solve one-step word problems involving addition or subtraction using data represented within pictographs and bar graphs with intervals of one (S)
2.10D	draw conclusions and make predictions from information in a graph (S)
1.8C	draw conclusions and generate and answer questions using information from picture and bar-type graphs (S)

K.8C

K.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:

(C) draw conclusions from real-object and picture graphs

Content Builder - (See Appendix for Tree Diagram)

- Draw conclusions (infer)
  - » real-object
  - » picture graphs

Instructional Implications

In alignment with K.8A/B, once students have collected their own data and displayed their data on either a real-object graph or pictograph, they are to draw their own conclusions (i.e. there are a lot more students that own dogs than cats in our class; we have four people in our class that own a cat because there are four pictures of cats; etc.). As students are the creators of the data and representation, they will be able to more accurately interpret the data.

Distractor Factor

- Due to developmental reasons, students may have more difficulty interpreting data from a picture graph than a real-object graph.

Academic Vocabulary

- Conclusions
- Real-object graphs
- Picture graphs

Rigor Implications

- Apply
- Collect
- Organize
- Interpret
- Draw (conclude)

STAAR
SUPPORTING
STANDARDS

K.2A K.2 Number and Operations. The student applies mathematical process standards to understand how to represent and compare whole numbers, the relative position and magnitude of whole numbers, and relationships within the numerations system. The student is expected to:
(A) count forward and backward to at least 20 with and without objects

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 3.2D use place value to compare and order whole numbers up to 100,000 and represent comparisons using the symbols <, >, or =
- 2.2D use place value to compare and order whole numbers up to 1,200 using comparative language, numbers and symbols (<,>,=)
- 1.2G represent the comparison of two numbers to 100 using the symbols >, <, or =
- K.2H use comparative language to describe two numbers up to 20 represented as written numerals

How does it support the Readiness Standard(s)?

Counting numbers backward and forward with and without objects develops the contextual understanding of value of numbers. This learning will support future comparing/ordering of numbers and informally develop a student's understanding of place value, the relative position of numbers, and the magnitude of numbers.

Instructional Implications

The counting sequence is a rote procedure. However, the understanding of relative position and magnitude of numbers related to counting is the key conceptual idea. Therefore, students must associate the counting words "one, two, three, four, etc." with a one-to-one correspondence of touching manipulatives (see K.2B). Moving students from counting forward to counting on and/or backward will be a developmental progression. Frequent short practice routines are recommended. With the inclusion of "at least" within the standard, the minimum expectation is that all students will count to 20 but students are not limited to 20.

Academic Vocabulary

- Backward
- Forward
- Numbers 1-20

Rigor Implications

- Apply
- Understand
- Represent
- Compare
- Count

K.2C K.2 Number and Operations. The student applies mathematical process standards to understand how to represent and compare whole numbers, the relative position and magnitude of whole numbers, and relationships within the numerations system. The student is expected to:
(C) count a set of objects up to at least 20 and demonstrate that the last number said tells the number of objects in the set regardless of their arrangement or order

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 3.4A solve with fluency one-step and two-step problems involving addition and subtraction within 1,000 using strategies based on place value, properties of operations, and the relationship between addition and subtraction
- 2.4C solve one-step and multi-step word problems involving addition and subtraction within 1,000 using a variety of strategies based on place value, including algorithms
- 1.3F generate and solve problem situations when given a number sentence involving addition or subtraction of numbers within 20
- 1.5G apply properties of operations to add and subtract two or three numbers

How does it support the Readiness Standard(s)?

Applying one-to-one correspondence to counting a set of objects up to 20 and understanding the cardinality rule will support student's ability to develop strategies to recall basic facts to solve addition/subtraction problems.

Instructional Implications

In conjunction with K.2B, students will learn to count objects and identify the associated counting word to represent the quantity. In order to adhere to this standard, students must have an understanding of the cardinality principle (the last number stated is the total amount of objects). When students count a set of objects and respond with the appropriate counting number this does not mean they understand the cardinality principle. For example, after rearranging that same number of objects a different way and asking students how many objects are in the set, the student should respond with the same number without recounting as the amount of objects did not change. Should a student need to recount using one-to-one correspondence each time the objects are moved, he/she does not understand the cardinality principle. This understanding will support future learning of how to add basic facts more fluidly (i.e. 8 + 4 = ___; with the understanding of the cardinality rule, students can begin counting on from 8 to determine four more 9, 10, 11,12 without having to count to eight and then 4 more 1, 2, 3, 4, 5, 6, 7, 8 9, 10, 11, 12).

Academic Vocabulary

- Numbers 1-20

Rigor Implications

- Apply
- Understand
- Represent
- Compare
- Count
- Demonstrate

K.2D K.2 Number and Operations. The student applies mathematical process standards to understand how to represent and compare whole numbers, the relative position and magnitude of whole numbers, and relationships within the numerations system. The student is expected to:
(D) recognize instantly the quantity of a small group of objects in organized and random arrangements

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 3.2D use place value to compare and order whole numbers up to 100,000 and represent comparisons using the symbols <, >, or =
- 2.2D use place value to compare and order whole numbers up to 1,200 using comparative language, numbers and symbols (<,>,=)
- 1.2G represent the comparison of two numbers to 100 using the symbols >, <, or =

How does it support the Readiness Standard(s)?

Being able to recognize the quantity of structured and random arrangements will support students in visually comparing two numbers.

Instructional Implications

Students learn to recognize dot arrangements on standard dice due to the many board games they have played. Similar instant recognition can be developed for other patterns as well (i.e. dominos, fingers, five/tens frame). Quantities up to 10 can be known and named without the routine of counting. Some students may continue to rely on physically counting using one-to-one correspondence to determine the total number of objects. However, with continuous exposure to pattern sets, students will begin to rely less on their counting skills and more on their spatial reasoning. A fun game of jacks can reinforce such understanding.

Academic Vocabulary

- Counting words

Rigor Implications

- Apply
- Understand
- Represent
- Compare
- Recognize

K.2E

K.2 Number and Operations. The student applies mathematical process standards to understand how to represent and compare whole numbers, the relative position and magnitude of whole numbers, and relationships within the numerations system. The student is expected to:

(E) generate a set using concrete and pictorial models that represents a number that is more than, less than, and equal to a given number up to 20

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 3.2D use place value to compare and order whole numbers up to 100,000 and represent comparisons using the symbols <, >, or =
- 2.2D use place value to compare and order whole numbers up to 1,200 using comparative language, numbers and symbols (<,>,=)
- 1.2G represent the comparison of two numbers to 100 using the symbols >, < , or =
- K.2H use comparative language to describe two numbers up to 20 presented as written numerals

How does it support the Readiness Standard(s)?

Generating a number greater than, less than, or equal to a given whole number with a set of concrete objects develops in students the understanding of the magnitude of whole numbers which will support their ability to compare/order numbers.

Instructional Implications

Students counting forward and backward from a given number or given set of objects (see K.2A) begin the foundational understanding of comparisons using the phrases 'more than' and 'less than. Instruction should include students being given a set of objects and asking them to create a set that is "one more, one less, two more, two less, etc." The idea of equivalence could include giving the students a set of objects and prompting them to generate a representation that is equal to a given number (i.e. given 3 color tiles, prompt students to create a set of color tiles that would be equal to 8 color tiles). This understanding will support students with the future learning of the strategy "adding on" for addition/subtraction (i.e. 3 + ____ = 8; 8 - 3 = ___).

Academic Vocabulary

- Equal to
- Less than
- More than

Rigor Implications

- Apply
- Understand
- Represent
- Compare
- Generate

K.2F K.2 Number and Operations. The student applies mathematical process standards to understand how to represent and compare whole numbers, the relative position and magnitude of whole numbers, and relationships within the numerations system. The student is expected to:
(F) generate a number that is one more than or one less than another number up to at least 20

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 3.2D use place value to compare and order whole numbers up to 100,000 and represent comparisons using the symbols <, >, or =
- 2.2D use place value to compare and order whole numbers up to 1,200 using comparative language, numbers and symbols (<,>,=)
- 1.2G represent the comparison of two numbers to 100 using the symbols >, <, or =
- K.2H use comparative language to describe two numbers up to 20 presented as written numerals

How does it support the Readiness Standard(s)?

In generating a number greater than, less than, or equal to a given whole number, students will develop the understanding of the magnitude of whole numbers which will support their ability to compare/order numbers.

Instructional Implications

As students become comfortable using manipulatives to generate a number that is more than, less than, or equal to a given number (see K.2E), instruction should then move to the abstract where students are just given a number (without an image/object) and asked to generate a number more than and/or less than an object.

Academic Vocabulary

- Less than
- More than

Rigor Implications

- Apply
- Understand
- Represent
- Compare
- Generate

K.2G K.2 Number and Operations. The student applies mathematical process standards to understand how to represent and compare whole numbers, the relative position and magnitude of whole numbers, and relationships within the numerations system. The student is expected to:
(G) compare sets of objects up to at least 20 in each set using comparative language

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 3.2D use place value to compare and order whole numbers up to 100,000 and represent comparisons using the symbols <, >, or =
- 2.2D use place value to compare and order whole numbers up to 1,200 using comparative language, numbers and symbols (<,>,=)
- 1.2G represent the comparison of two numbers to 100 using the symbols >, < , or =
- K.2H use comparative language to describe two numbers up to 20 presented as written numerals

How does it support the Readiness Standard(s)?

As students compare sets of objects, they need to use the appropriate academic vocabulary (greater than, less than, equal to) before moving to the abstract use of comparison symbols (<, >, or =).

Instructional Implications

Students will compare two sets of objects using the correct academic vocabulary (i.e. 12 color tiles is more than 9 color tiles). It is important for students to recognize the inverse comparison statement as well (i.e. 9 color tiles is less than 12 color tiles). Encourage students to articulate both comparison statements during activities. In adherence to the standard, the minimum state expectation is to compare numbers through 20. However, with the inclusion of the phrase "at least," instruction may extend beyond 20 for those student that are developmentally ready.

Academic Vocabulary

- Equal to
- Greater than
- Less than
- More than

Rigor Implications

- Apply
- Understand
- Represent
- Compare
- Use

K.3A K.3 Number and Operations. The student applies the 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

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 3.4A solve with fluency one-step and two-step problems involving addition and subtraction within 1,000 using strategies based on place value, properties of operations, and the relationship between addition and subtraction
- 2.4C solve one-step and multi-step word problems involving addition and subtraction within 1,000 using a variety of strategies based on place value, including algorithms
- 1.3F generate and solve problem situations when given a number sentence involving addition or subtraction of numbers within 20
- K.3B solve word problems using objects and drawings to find sums up to 10 and differences within 10

How does it support the Readiness Standard(s)?

The use of concrete objects and pictorial models to demonstrate joining and separation situations will support a student's understanding of the context of addition and subtraction problems. Connecting such actions to their corresponding number sentence will support students to move from concrete to the abstract understanding.

Instructional Implications

Instruction should focus on the meaning of addition and subtraction through the lens of the terms joining and separating. Instruction should provide multiple opportunities for students to use manipulatives to act out their understanding of joining and separating to distinguish between the two operations. Instruction should include both prepared story problems for students to act out and student generated story problems to model their understanding of the difference between the two operations.
Joining and separating word problems should include a variety of contexts.
Joining: Sarah had 7 pencils. Juan gave her 3 more pencils. How many pencils does Sarah have now? Sarah had 7 pencils. Juan gave her some more pencils. Now Sarah has 10 pencils. How many pencils did Juan give her? Sarah had some pencils. Juan gave her 3 pencils. Now Sarah has a total of 10 pencils. How many pencils did Sarah have to begin with?
Separating: Sarah had 10 pencils. She gave 3 pencils to Juan. How many pencils does Sarah have now? Sarah had a total of 10 pencils. She gave some to Juan. Now she only has 3 pencils. How many pencils did she give to Juan? Sarah had some pencils. She gave 3 to Juan. Now Sarah has 7 pencils left. How many pencils did Sarah have before?

Academic Vocabulary

- Joining (addition)
- Separating (subtraction)

Rigor Implications

- Apply
- Develop
- Understand
- Solve
- Model

K.3C

K.3 Number and Operations. The student applies the mathematical process standards to develop an understanding of addition and subtraction situations in order to solve problems. The student is expected to:

(C) explain the strategies used to solve problems involving adding and subtracting within 10 using spoken words, concrete and pictorial models, and number sentences

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 3.4A solve with fluency one-step and two-step problems involving addition and subtraction within 1,000 using strategies based on place value, properties of operations, and the relationship between addition and subtraction
- 2.4C solve one-step and multi-step word problems involving addition and subtraction within 1,000 using a variety of strategies based on place value, including algorithms
- 1.3F generate and solve problem situations when given a number sentence involving addition or subtraction of numbers within 20
- 1.5G apply properties of operations to add and subtract two and three numbers
- K.3B solve word problems using objects and drawings to find sums to 10 and differences within 10

How does it support the Readiness Standard(s)?

Being able to relate the manipulation of concrete objects to pictorials to a number sentence is a critical transition to move students from the concrete to the abstract understanding of addition and subtraction.

Instructional Implications

In conjunction with K.6A/F, as students begin solving joining and separating problems, they should explain their thought processes orally, using objects/pictures, and with number sentences. Students should orally explain how his/her picture relates to the given number sentence (i.e. In the number sentences 2+ 3 = 5 and 5 = 2 + 3; these two blue birds in the picture stand for the 2 in the number sentence. These three red birds in the picture joined the blue birds which is the +3 in my number sentence. There is now a total of 5 birds sitting in the tree which is the same as 5 in the number sentence). Real world situations should be extended beyond two addends (i.e. There are two blue birds, one red robin, and one hummingbird in the tree. How many birds are in the tree?).

Academic Vocabulary

- Addition (joining)
- Equal sign
- Number sentence
- Subtraction (separating)

Rigor Implications

- Apply
- Develop
- Understand
- Solve
- Explain

K.4A K.4 Number and Operations. The student applies mathematical process standards to identify coins in order to recognize the need for monetary transactions. The student is expected to:

Identify U.S. coins by name, including pennies, nickels, dimes, and quarters

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 2.5A determine the value of a collection of coins up to one dollar
- 1.4C use relationships to count by twos, fives, and tens to determine the value of a collection of pennies, nickels and/or dimes

How does it support the Readiness Standard(s)?

Being able to identify U.S. coins is critical in solving monetary transactions.

Instructional Implications

In adherence to the standard, students only have to identify coins in Kindergarten. The value of the coin is introduced in grade 1 (see 1.4A). Describing the attributes of the coins may support students with identifying them correctly (i.e. color, size, smooth vs. rough edges, etc.). Students need to identify the coin whether the heads or tails side of the coin is visible. Focusing on the attributes of the coin will support students in appropriately identifying all versions of coins.

The standard also requires that the students recognize the need for coins in monetary transactions which would be a connection to the personal financial literacy strand (K.9).

Academic Vocabulary

- Cent
- Coin
- Dime
- Nickel
- Penny
- Quarter

Rigor Implications

- Apply
- Identify
- Recognize

K.5A K.5 Algebraic Reasoning. The student applies mathematical process standards to identify the pattern in the number word list. The student is expected to:

(A) recite numbers up to at least 100 by ones and tens beginning with any given number

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 3.4A solve with fluency one-step and two-step problems involving addition and subtraction within 1,000 using strategies based on place value, properties of operations, and the relationship between addition and subtraction
- 2.4C solve one-step and multi-step word problems involving addition and subtraction within 1,000 using a variety of strategies based on place value, including algorithms

How does it support the Readiness Standard(s)?

Reciting numbers by ones and tens starting at any given number will informally introduce the ones and tens place value. This understanding will be critical in being able to develop algorithms based on place value in order to solve addition/subtraction problems.

Instructional Implications

The counting sequence is a rote procedure. Therefore, counting to 100 will become routine for students. However, this standard requires students to develop patterns within the number system, so they may be able to begin counting by ones or tens starting at any number (i.e. counting by ones starting at 32; counting by tens starting at 30). The use of a 100's chart may be a helpful tool for students to begin recognizing these patterns. The TEKS also require students to identify patterns in the number word list as well. Students are not required to read or write number words but they are required to recognize the patterns. Therefore, instruction needs to include exposure to the number word version (i.e. "twenty-four") in addition to the symbolic representation (i.e. "24").

Academic Vocabulary

- Counting Words 0-100
- Ones
- Tens

Rigor Implications

- Apply
- Identify
- Recite

K.6A K.6 Geometry and Measurement. The student applies mathematical process standards to analyze attributes of two-dimensional shapes and three-dimensional solids to develop generalization about their properties. The student is expected to:
(A) identify two-dimensional shapes, including circles, triangles, rectangles, and squares as special rectangles

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 3.6A classify and sort two- and three-dimensional figures, including cones, cylinders, spheres, triangular and rectangular prism, and cubes, based on attributes using formal geometric language
- 2.8B classify and sort three-dimensional solids, including spheres, cones, cylinders, rectangular prisms (including cubes as special rectangular prisms), and triangular prisms, based on attributes using formal geometric language
- 1.6E identify three-dimensional solids, including spheres, cones, cylinders, rectangular prisms (including cubes) and triangular prisms, and describe the their attributes using formal geometric language
- K.6E classify and sort a variety of regular and irregular two-dimensional and three-dimensional figures regardless of orientation or size

How does it support the Readiness Standard(s)?

The ability to identify two-dimensional shapes based on their geometric attributes and properties supports the future classification and sorting of such figures.

Instructional Implications

Students should use the attributes of given shapes (K.6D) to correctly identify a shape. A variety of shapes (i.e. equilateral triangle, scalene triangle, right triangle, etc.) and a variety of orientations, color, and thickness should be used to ensure that students use the geometric attributes to identify a shape. Instruction should clearly identify a square as a rectangle because it has four sides and four vertices. Students need to view a square as a special rectangle because all of its sides are of equal length. As students begin to recognize how circles are curved and triangles, rectangles, squares have straight sides, instruction can begin modeling the term polygon for those two-dimensional shapes that are enclosed with straight sides.

Academic Vocabulary

- Attribute
  - » Curved/straight
  - » Side
  - » Vertex/vertices
- Polygon
- Shape
  - » Circle
  - » Rectangle
  - » Square as a special rectangle
  - » Triangle
- Two-dimensional

Rigor Implications

- Apply
- Analyze
- Develop
- Identify

K.6B K.6 Geometry and Measurement. The student applies mathematical process standards to analyze attributes of two-dimensional shapes and three-dimensional solids to develop generalization about their properties. The student is expected to:
(B) identify three-dimensional solids, including cylinders, cones, spheres, and cubes, in the real world

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 3.6A classify and sort two- and three-dimensional figures, including cones, cylinders, spheres, triangular and rectangular prism, and cubes, based on attributes using formal geometric language
- 2.8B classify and sort three-dimensional solids, including spheres, cones, cylinders, rectangular prisms (including cubes as special rectangular prisms), and triangular prisms, based on attributes using formal geometric language
- 1.6E identify three-dimensional solids, including spheres, cones, cylinders, rectangular prisms (including cubes) and triangular prisms, and describe the their attributes using formal geometric language
- K.6E classify and sort a variety of regular and irregular two-dimensional and three-dimensional figures regardless of orientation or size

How does it support the Readiness Standard(s)?

Being able to identify three-dimensional figures in the real world provides a concrete visual to future students of the geometric attributes and properties.

Instructional Implications

Students should use the attributes of a given solid to correctly identify a related real world example (i.e. a rectangular prism has six faces, eight vertices, and 12 edges and so does a cereal box). A variety of real world three-dimensional solids should be provided (i.e. cone: ice cream cone, party hat, megaphone, water dispensing cup, etc.)

Academic Vocabulary

- Attribute
  - » Edge
  - » Face
  - » Vertex/vertices
- Solid
- Three-dimensional
  - » Cone
  - » Cube
  - » Cylinder
  - » Sphere

Rigor Implications

- Apply
- Analyze
- Develop
- Identify

K.6C K.6 Geometry and Measurement. The student applies mathematical process standards to analyze attributes of two-dimensional shapes and three-dimensional solids to develop generalization about their properties. The student is expected to:
(C) identify two-dimensional components of three-dimensional objects

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 3.6A classify and sort two- and three-dimensional figures, including cones, cylinders, spheres, triangular and rectangular prism, and cubes, based on attributes using formal geometric language
- 2.8C classify and sort polygons with 12 sides or fewer sides according to attributes including identifying the number of sides and number of vertices
- 2.8B classify and sort three-dimensional solids, including spheres, cones, cylinders, rectangular prisms (including cubes as special rectangular prisms), and triangular prisms, based on attributes using formal geometric language
- 1.6D identify two-dimensional shapes, including circles, triangles, rectangles, and squares as special rectangles, rhombuses, and hexagons, and describe their attributes using formal geometric language
- 1.6E identify three-dimensional solids, including spheres, cones, cylinders, rectangular prisms (including cubes), and triangular prisms, and describe their attributes using formal geometric language
- K.6E classify and sort a variety of regular and irregular two-dimensional and three-dimensional figures regardless of orientation or size
- K.7B compare two objects with a common measureable attribute to see which object has more of/less of the attribute and describe the differences

How does it support the Readiness Standard(s)?

Identifying how three-dimensional solids consist of two-dimensional shapes will allow students to focus on the various attributes. This understanding will support the sorting and classification of various figures.

Instructional Implications

Students need to understand that three-dimensional solids are made up of two-dimensional shapes/polygons. Providing students opportunities where they stamp out the various sides of three-dimensional solids (i.e. taking a cube and making six square face imprints on clay) will demonstrate how the two are related to each other. During such activities, students should identify polygons and how many of each type of two-dimensional shapes make up a given solid (i.e. a triangular prism is made up of five polygons; two triangles and three rectangles). Instruction should introduce how the two-dimensional shapes represent the faces of a three-dimensional solid, the sides of a polygon create the edges of a solid, and the vertices of the polygon relate to the number of vertices on a solid. Students should analyze how the number of vertices/sides of a polygon compares to that of a solid (i.e. a square has four sides and four vertices. A cube is comprised of six square faces. However, a cube does not have 24 sides and 24 vertices because some of the vertices and sides of the square overlap in creating the solid).

Academic Vocabulary

- Attribute
  - » Edge/Side
  - » Face
  - » Vertex/vertices
- Polygon
- Shape
- Solid
- Three-dimensional
- Two-dimensional

Rigor Implications

- Apply
- Analyze
- Develop
- Identify

K.6D K.6 Geometry and Measurement. The student applies mathematical process standards to analyze attributes of two-dimensional shapes and three-dimensional solids to develop generalization about their properties. The student is expected to:

(D) identify attributes of two-dimensional shapes using informal and formal geometric language interchangeably

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 3.6A classify and sort two- and three-dimensional figures, including cones, cylinders, spheres, triangular and rectangular prism, and cubes, based on attributes using formal geometric language
- 2.8C classify and sort polygons with 12 sides or fewer sides according to attributes including identifying the number of sides and number of vertices
- 1.6D identify two-dimensional shapes, including circles, triangles, rectangles, and squares as special rectangles, rhombuses, and hexagons, and describe their attributes using formal geometric language
- K.6E classify and sort a variety of regular and irregular two-dimensional and three-dimensional figures regardless of orientation or size

How does it support the Readiness Standard(s)?

As students begin discovering attributes of various two-dimensional shapes, they need to translate their informal descriptions to more formal geometric vocabulary. This foundational understanding will support their ability to sort and classify two-dimensional figures.

Instructional Implications

Students may describe a given two-dimensional shape as having "three lines" and/or "three pointy corners." Teachers should then paraphrase those responses using the correct formal vocabulary, such as "three sides and three vertices." With exposure, students will begin to use the appropriate academic terms.

Academic Vocabulary

- Attribute
  - » Side
  - » Vertex/vertices
- Polygon
- Shape
- Two-dimensional

Rigor Implications

- Apply
- Analyze
- Develop
- Identify

K.6F K.6 Geometry and Measurement. The student applies mathematical process standards to analyze attributes of two-dimensional shapes and three-dimensional solids to develop generalization about their properties. The student is expected to:
(F) create two-dimensional shapes using a variety of materials and drawings

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 3.6A classify and sort two- and three-dimensional figures, including cones, cylinders, spheres, triangular and rectangular prism, and cubes, based on attributes using formal geometric language
- 2.8C classify and sort polygons with 12 sides or fewer sides according to attributes including identifying the number of sides and number of vertices
- 1.6D identify two-dimensional shapes, including circles, triangles, rectangles, and squares as special rectangles, rhombuses, and hexagons, and describe their attributes using formal geometric language
- K.6E classify and sort a variety of regular and irregular two-dimensional and three-dimensional figures regardless of orientation or size

How does it support the Readiness Standard(s)?

Creating two-dimensional shapes of given attributes (i.e. the number of sides and vertices) and properties (i.e. all sides are of different lengths) allows students to focus on the geometric attributes of a figure. This attention to specific attributes and properties supports the classification and sorting of various figures.

Instructional Implications

This standard requires students to apply their ability to identify attributes of two-dimensional shapes (K.6A/C/D) to creating them. Instruction should vary the materials (i.e. spaghetti, straws, toothpicks, pennies, string, etc.). It is important to observe student selection of appropriate materials (i.e. will students recognize that three straws would be easier to demonstrate a triangle than three pennies). Instruction should extend the study of attributes by taking an already created shape and asked to modify it to create a new shape (i.e. students made a rectangle out of clay; student is asked to modify the rectangle to make it a square and explain how the attributes/properties of the two shapes were similar yet different).

Academic Vocabulary

- Attribute
- Shape
  - » Circle
  - » Polygon
  - » Rectangle
  - » Square as a special rectangle
  - » Triangle
- Two-dimensional

Rigor Implications

- Apply
- Analyze
- Develop
- Create

K.7A K.7 Geometry and Measurement. The student applies mathematical process standards to directly compare measureable attributes. The student is expected to:

(A) give an example of a measureable attribute of a given object, including length, capacity, and weight

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 3.7B determine the perimeter of a polygon or a missing length when given perimeter and remaining side lengths in problems
- 2.9E determine a solution to a problem involving length, including estimating lengths
- 1.7D describe a length to the nearest whole unit using number and a unit

How does it support the Readiness Standard(s)?

Being able to ascertain a measureable attribute will support students in understanding the difference between length, capacity, and weight. Distinguishing among those three types of measurements is foundational to selecting appropriate tools, applying appropriate units of measure, and solving measurement problems.

Instructional Implications

Students are given an object (i.e. box of cereal) and asked to identify a measureable attribute (i.e. student responds "we could measure how long it is, how much cereal it holds, or how much it weighs."). According to the TEKS, students are to use comparative language to describe their findings (i.e. student responds, "This cereal box is longer/shorter than this one. This cereal box holds more/less cereal than this one. This cereal box weighs more/less than this one."). The use of this comparative language also supports K.2G. Encourage students to articulate two statements for each comparison (i.e. Cereal Box A held more cereal that Cereal Box B; Cereal Box B held less cereal than Cereal Box A).

Academic Vocabulary

- Capacity
- Length
- Measureable attribute
- Weight

Rigor Implications

- Apply
- Compare
- Give

K.8A K.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

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 3.8A summarize a data set with multiple categories using a frequency table, dot plot, pictograph, or bar graph with scaled intervals
- 2.10C write and solve one-step word problems involving addition or subtraction using data represented within pictographs and bar graphs with intervals of one
- 1.8C draw conclusions and generate and answer question using information from picture and bar-type graphs
- K.8B use data to create real-object and picture graphs
- K.8C draw conclusions from real-object and picture graphs

How does it support the Readiness Standard(s)?

Having students collect, sort, and organize their own data facilitates students as they draw reasonable conclusions and make reasonable predictions more easily. Representing student collected data on real-object graphs and picture graphs enables students to interpret the information more accurately.

Instructional Implications

In order to adhere to the standard, students should be the ones to collect, sort, and organize the data. Instruction should only prompt the actions (i.e. The teacher says: I wonder how many of us own a dog or a cat? What could we do to collect that data?; How could you organize the data collected?). Data categories can extend to no more than three categories (i.e. "What is your favorite sport?" yield too many different categories; "Do you like to play football, basketball, or baseball" limits the categories to no more than 3).

Academic Vocabulary

- Categories
- Data

Rigor Implications

- Apply
- Collect
- Sort
- Organize
- Interpret

K.9A K.9 Personal Financial Literacy. The student applies mathematical process standards to manage one's financial resources effectively for lifetime financial security. The student is expected to:

(A) identify ways to earn income

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- K.9 Personal Financial Literacy

How does it support the Readiness Standard(s)?

Identifying ways to earn income will support one's ability to manage financial resources more effectively for a lifetime of financial security.

Instructional Implications

Instruction should allow students the opportunity to discuss how their parents earn income and how students can earn income. Teachers could incorporate story problems involving real world situations of money being earned into the Number and Operations strand (see K.2H and K.3A/B/C).

Academic Vocabulary

- Income
- Money

Rigor Implications

- Apply
- Identify

K.9B K.9 Personal Financial Literacy. The student applies mathematical process standards to manage one's financial resources effectively for lifetime financial security. The student is expected to:

(B) differentiate between money received as income and money received as gifts

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- K.9 Personal Financial Literacy

How does it support the Readiness Standard(s)?

Understanding the difference between money earned vs. money received as a gift supports one's ability to manage financial resources more effectively for a lifetime of financial security.

Instructional Implications

Instruction should allow students the opportunity to discuss the difference between working for money as income compared to money given as a gift. Doing chores to earn money is income; money received from family/friends for birthdays/holidays is a gift. Teachers could incorporate story problems involving real world situations of money being earned as income and/or gifts into the Number and Operations strand (see K.2H and K.3A/B/C).

Academic Vocabulary

- Gift
- Given/Earned
- Income
- Money

Rigor Implications

- Apply
- Differenciate

K.9C K.9 Personal Financial Literacy. The student applies mathematical process standards to manage one's financial resources effectively for lifetime financial security. The student is expected to:

(C) list simple skills required for jobs

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- K.9 Personal Financial Literacy

How does it support the Readiness Standard(s)?

Identifying ways to earn income will support one's ability to manage financial resources more effectively for a lifetime of financial security.

Instructional Implications

Instruction should allow students to investigate different job choices and participate in discussions about what skills are needed to do such jobs.

Academic Vocabulary

- Jobs
- Skills

Rigor Implications

- Apply
- List

K.9D K.9 Personal Financial Literacy. The student applies mathematical process standards to manage one's financial resources effectively for lifetime financial security. The student is expected to:

(D) distinguish between wants and needs and identify income as a source to meet one's wants and needs

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- K.9 Personal Financial Literacy

How does it support the Readiness Standard(s)?

Understanding the difference between wants and needs and how income serves as a way to obtain such measures will support one's ability to manage financial resources more effectively for a lifetime of financial security.

Instructional Implications

Instruction should provide students with a variety of suggested wants and needs to sort (i.e. water, food, shelter, clothes, video games, cell phones, etc.). Students should defend the category they choose and debate among their classmates. In alignment with K.9A, students need to recognize that earning an income is a source for meeting those wants and needs. Teachers could incorporate story problems involving real world situations of wants and needs into the Number and Operations strand (see K.2H and K.3A/B/C).

Academic Vocabulary

- Income
- Needs
- Wants

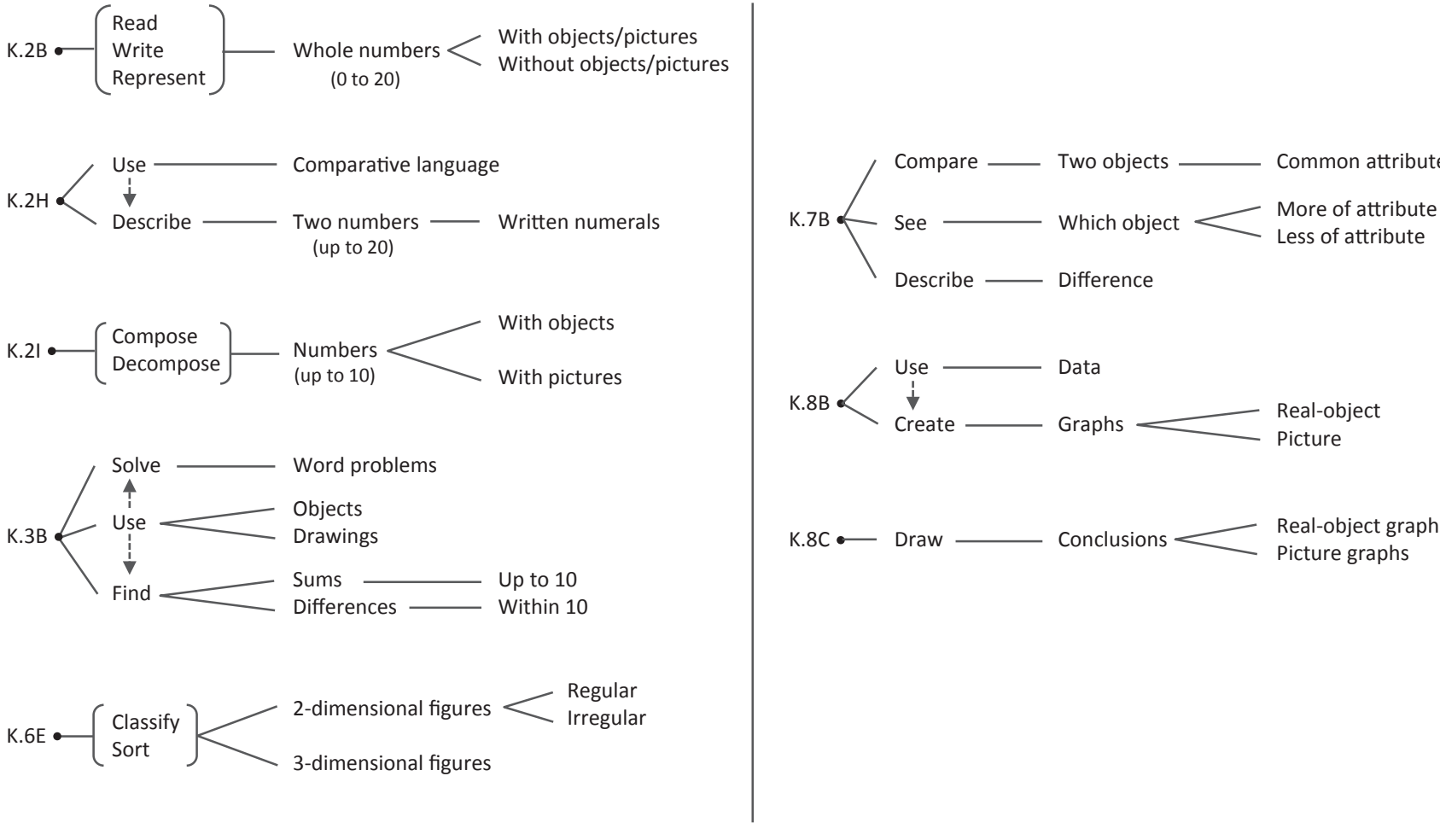
Rigor Implications

- Apply
- Distinguish

APPENDIX

TREE DIAGRAM

Kindergarten Math TEKS Tree - Readiness Standards



*NOTE: The classification of Kindergarten "readiness" standards on this document represents the reviewed and synthesized input from a sample of Texas mathematics teachers. This DOES NOT represent an endorsement of the Texas Education Agency.

TEKS Student Expectations for implementation beginning 2014-2015.