
STAAR Comparison 2014 versus 2015

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1 INTRODUCTION

To evaluate how the 2012 TEKS differ from the 1998 TEKS, I decided to take all of the 2014 Math STAAR Assessments for 3rd grade through 8th grade and compare them to the released 2015 Math STAAR Assessment questions for 3rd grade through 8th grade.

2 SUMMARY

Before I completed this task I was under the impression that the main problem with the TEKS was the process standards in the 2012 revision, but after further review of the TEKS I have found that the content standards are calling out specific methods to be used in solving problems. While the Process Standards force multiple methods with the use of the word “Including” and the use of “And” instead of “Or,” the Content Standards also need to be revisited.

Many of these methods were also in the 2014 TEKS: 4th grade 2014 TEKS call for the use of the area model and arrays. Pictorial models are called out in the 2014 1st, 3rd and 4th grade.

In the 2012 TEKS the use of these alternate methods has dramatically increased. The K-5 Content standards call for the use of area model (a method of multiplication) 9 times and the use of pictorial models 23 times. There are many more examples of these “process” or “methodology” questions in the 2015 released STAAR questions (and they only released about half of the question).

The Process Standards in the 2012 TEKS

- (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;
 - (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;
 - (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;
 - (D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;
 - (E) create and use representations to organize, record, and communicate mathematical ideas;
 - (F) analyze mathematical relationships to connect and communicate mathematical ideas; and
 - (G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

3 STAAR 3RD GRADE MATH QUESTIONS

3.1 2014 Math STAAR

Problem 5 is an example of a multi-step problem. The student has to recognize that each division on the bar graph is 12. Then the student has to calculate the number of people who went fishing and the number of people who went bird watching. Next, the student has to add up all of the given activities. For a student that can only add two numbers at a time we are up to 6 steps. Next the student has to subtract this number from the total number of people that participated in the activities to find the number of people that went swimming. The eighth and final step is to check which table has all of the correct numbers. This is a bit much to ask for a third grader.

TEK 3.13 states: (Readiness Content Standard)

(3.13) Measurement. The student applies measurement concepts. The student is expected to measure to solve problems involving length, area, temperature, and time.

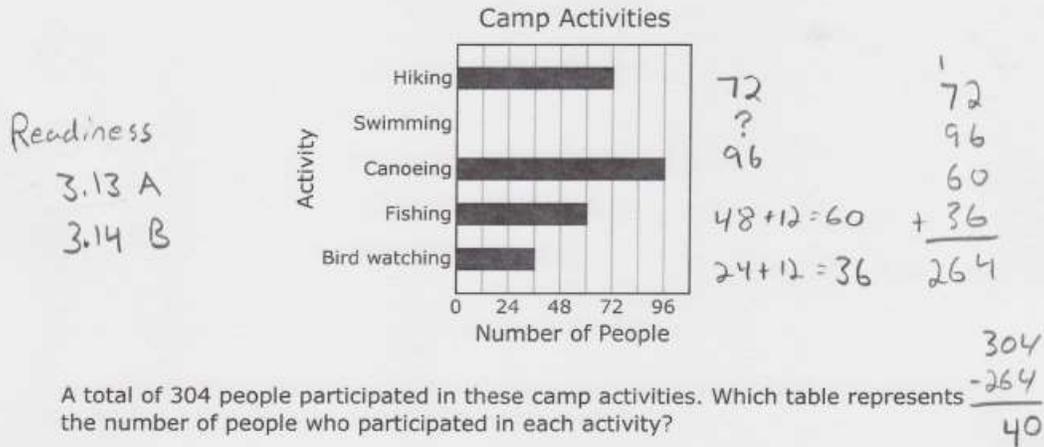
TEK 3.14 B states: (Process Standard)

(3.14) Probability and statistics. The student solves problems by collecting, organizing, displaying, and interpreting sets of data. The student is expected to:

(B) interpret information from pictographs and bar graphs; and

It is clear to me that this particular problem covers more than just these two TEKS.

- 5 The graph below shows the number of people who participated in different camp activities last week. The number of people who went swimming is missing.



A

Camp Activities	
Activity	Number of People
Hiking	72
Swimming	64
Canoeing	96
Fishing	48
Bird watching	24

C

Camp Activities	
Activity	Number of People
Hiking	72
Swimming	40
Canoeing	96
Fishing	60
Bird watching	36

B

Camp Activities	
Activity	Number of People
Hiking	72
Swimming	16
Canoeing	96
Fishing	72
Bird watching	48

D

Camp Activities	
Activity	Number of People
Hiking	72
Swimming	50
Canoeing	96
Fishing	60
Bird watching	36

Problem 8 is checking more than TEK 3.7 B.

TEK 3.7 B states: (Readiness Content Standard)

(3.7) Patterns, relationships, and algebraic thinking. The student uses lists, tables, and charts to express patterns and relationships. The student is expected to:

- (B) identify patterns in a table of related number pairs based on a real-life situation and extend the table.

TEK 3.15 B states (Process Standard)

(3.15) Underlying processes and mathematical tools. The student applies Grade 3 mathematics to solve problems connected to everyday experiences and activities in and outside of school.

The student is expected to:

- (B) use a problem-solving model that incorporates understanding the problem making a plan, carrying out the plan, and evaluating the solution for reasonableness;

There is more than one way to recognize the pattern in this problem. Most students see the +3, +4 +5 pattern and can extend the table as required by the TEK. But this question takes it step further and asks you to find the number sentence that can be used to find out how many white stars are on the poster with 35 red stars. I think asking a third grader to fill in the missing number is more than enough. If they solved the problem recognizing the pattern as I did (+3, +4, +5) they might not be able to see the -21 method...

8 The table below shows the relationship between the number of red stars and the number of white stars Adyssen drew on different posters.

Posters

Number of White Stars	7	10		19
Number of Red Stars	28	31	35	40

Based on the pattern in the table, which number sentence can be used to find the number of white stars Adyssen drew if she drew 35 red stars on a poster?

F $19 - 10 = 9$

G $35 - 21 = 14$

H $7 + 10 = 17$

J $10 + 3 = 13$

Readiness
 3.7 B
 3.15 B

Pattern
 +3 +4 +5

28	31	40
-7	-10	-19
21	21	21

Problem 32 is another example of where one problem turns into many as you have to perform calculations to check each of the answers. So instead of this problem being one calculation it can be as many as eight (if the student cannot add multiple numbers using the standard algorithm stacking method).

This problem says it covers TEK 3.13 B but TEK 3.13 does not have an A or B...

TEK 3.13 states: (Supporting Content Standard)

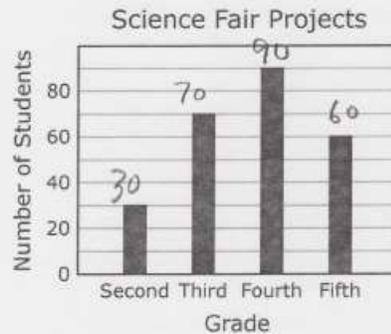
(3.13) Measurement. The student applies measurement concepts. The student is expected to measure to solve problems involving length, area, temperature, and time.

TEK 3.14 A states: (Process Standard)

(3.14) Probability and statistics. The student solves problems by collecting, organizing, displaying, and interpreting sets of data. The student is expected to:

(A) collect, organize, record, and display data in pictographs and bar graphs where each picture or cell might represent more than one piece of data;

32 The graph below shows the number of students at different grade levels who brought projects for a science fair.



Based on the graph, which statement is true?

- F A total of 110 students in second grade and fourth grade brought a project.
- G Exactly 40 fewer fourth-grade students brought a project than third-grade and fifth-grade students combined.
- H A total of 220 students in these grades brought a project.
- J Exactly 90 fewer third-grade students brought a project than fourth-grade and fifth-grade students combined.

$$\begin{array}{r} 30 \\ + 90 \\ \hline 120 \\ \times \end{array}$$

$$\begin{array}{r} 70 \\ + 60 \\ \hline 130 \end{array}$$

$$\begin{array}{r} 130 \\ - 90 \\ \hline 40 \\ \checkmark \end{array}$$

$$\begin{array}{r} 30 \\ 70 \\ 90 \\ + 60 \\ \hline 250 \\ \times \end{array}$$

$$\begin{array}{r} 90 \\ + 60 \\ \hline 150 \end{array}$$

$$\begin{array}{r} 150 \\ - 70 \\ \hline 80 \\ \times \end{array}$$

Supporting
3.13 B
3.14 A

3.2 2015 Math STAAR

Question 20 is only testing if the student knows the definition of congruent and area. The question already states that the shaded areas are both $\frac{1}{4}$ and it is pretty clear the rectangles are the same size.

TEK 3.6 E states: (Supporting Content Standard)

- (6) Geometry and measurement. The student applies mathematical process standards to analyze attributes of two-dimensional geometric figures to develop generalizations about their properties. The student is expected to:

TEK 3.1 B, E & G states (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
- (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;
 - (E) create and use representations to organize, record, and communicate mathematical ideas;
 - (G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

20 The two figures shown are congruent, and one-fourth of each figure is shaded.

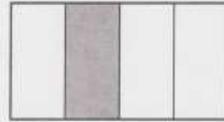


Figure M

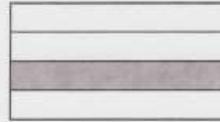


Figure N

Which statement about the shaded parts of these figures is true?

- A The area of the shaded part of Figure M is greater than the area of the shaded part of Figure N.
- B The area of the shaded part of Figure M is less than the area of the shaded part of Figure N.
- C The area of the shaded part of Figure M is equal to the area of the shaded part of Figure N.
- D None of the above

Testing definition
of congruent.

Supporting
3.6 E
3.1 BEG

Problem 23 is a good example of how the 2015 questions are not as difficult as the 2014 questions. This problem is solved in 3 steps and tests 2012 TEK 3.8 A (which was the 1998 TEK 3.13 A, problem 5 from above that had 8 steps).

TEK 3.8 A states: (Readiness Content Standard)

(8) Data analysis. The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data. The student is expected to:

(A) summarize a data set with multiple categories using a frequency table, dot plot, pictograph, or bar graph with scaled intervals; and

TEK 3.1 A, B, D & F states: (Process Standard)

(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

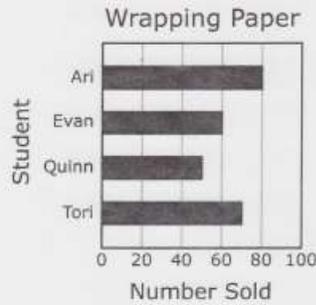
(A) apply mathematics to problems arising in everyday life, society, and the workplace;

(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;

(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

(F) analyze mathematical relationships to connect and communicate mathematical ideas; and

23 The graph shows the number of rolls of wrapping paper sold by four students.



Ari 80
 Evan 60
 Quinn 40 + 10 = 50
 Tori 60 + 10 = 70

Which table represents the information in the graph?

A

Student	Number Sold
Ari	80
Evan	60
Quinn	50
Tori	70

C

Student	Number Sold
Ari	80
Evan	60
Quinn	45
Tori	65

B

Student	Number Sold
Ari	80
Evan	60
Quinn	40
Tori	60

D

Student	Number Sold
Ari	80
Evan	60
Quinn	60
Tori	80

Readiness
 3.8 A
 3.1 A B D F

4 STAAR 4TH GRADE MATH QUESTIONS

Some of the 2015 test questions just seem a bit awkwardly worded... I can only guess it is because TEKS moved down in grade level. I will need to give this more inspection to confirm.

4.1 2014 Math STAAR

Problem 17 is testing modeling factors using arrays and area models. Why do we test on being able to draw or recognize arrays and area models? The ability to perform the multiplication and compare the numbers is the more important skill. Nowhere in the real world would you keep a job if you had to draw out an array to perform a calculation, so why is it important enough to test? This particular method survived and expanded in the 2012 TEKS.

TEK 4.4 A states: (Supporting Content Standard)

(4.4) Number, operation, and quantitative reasoning. The student multiplies and divides to solve meaningful problems involving whole numbers. The student is expected to:

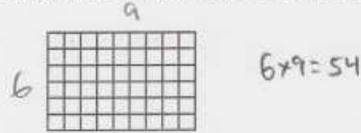
(A) model factors and products using arrays and area models;

TEK 4.14 D states: (Process Standard)

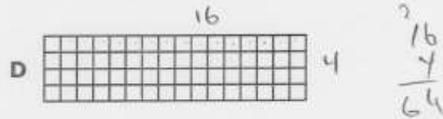
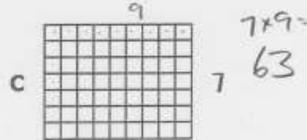
(4.14) Underlying processes and mathematical tools. The student applies Grade 4 mathematics to solve problems connected to everyday experiences and activities in and outside of school. The student is expected to:

(D) use tools such as real objects, manipulatives, and technology to solve problems.

17 The length and width of the array below represent two factors of a number.



Which array represents two different factors of the same number?



Supporting
4.4 A
4.14 D

4.2 2015 Math STAAR

Problem 12 is an example of an early introduction into Algebra. I don't think most 4th graders are ready for this, but at least they don't ask the students to solve for n .

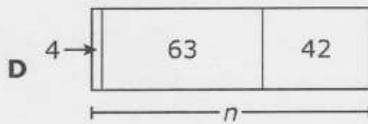
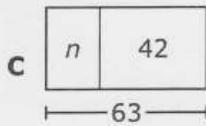
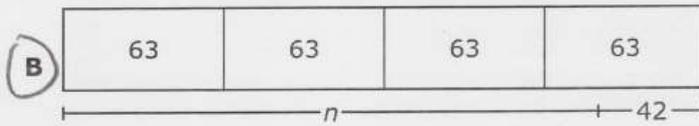
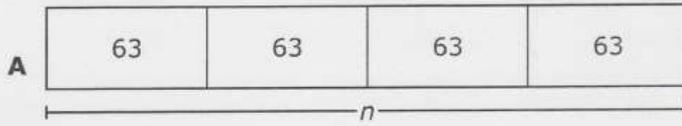
TEK 4.5 A states: (Readiness Content Standard)

- (5) Algebraic reasoning. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:
 - (A) represent multi-step problems involving the four operations with whole numbers using strip diagrams and equations with a letter standing for the unknown quantity;

TEK 4.1 A, B, D, F states (Process Standard)

- (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;
 - (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;
 - (D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;
 - (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

12 Madeline has 4 rolls of tape. Each roll contains 63 inches of tape. Madeline used 42 inches of tape for a project. Which diagram shows a way to find n , the number of inches of tape that Madeline has left?



$$4(63) = n + 42$$

Readiness

4.5 A

4.1 A B D F

5 STAAR 5TH GRADE MATH QUESTIONS

5.1 2014 Math STAAR

Problem 1 is an example of a 5 step problem. Seems a bit more rigorous than most of the 2015 questions for 5th grade.

TEK 5.3 B states: (Readiness Content Standard)

(5.3) Number, operation, and quantitative reasoning. The student adds, subtracts, multiplies, and divides to solve meaningful problems. The student is expected to:

- (B) use multiplication to solve problems involving whole numbers (no more than three digits times two digits without technology);

TEK 5.14 C states: (Process Standard)

(5.14) Underlying processes and mathematical tools. The student applies Grade 5 mathematics to solve problems connected to everyday experiences and activities in and outside of school. The student is expected to:

- (C) select or develop an appropriate problem-solving strategy, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem; and

1 The table below shows the prices of different movie tickets.

Movie Ticket Prices

Type of Movie	Adult Ticket	Child Ticket
General admission	\$10	\$7
Matinee	\$8	\$7
Special event	\$14	\$12
3-D	\$13	\$10

Mr. Gallego bought 2 adult tickets and 4 child tickets for his family and paid a total of \$66. For which type of movie are Mr. Gallego's tickets?

- A General admission
- B Matinee
- C Special event
- D 3-D

$$2a + 4c = 66$$

$$2 \cdot 10 + 4 \cdot 7 = 48 \quad \text{General}$$

$$2 \cdot 8 + 4 \cdot 7 = 44 \quad \text{Matinee}$$

$$2 \cdot 14 + 4 \cdot 12 = 76 \quad \text{Special event}$$

$$2 \cdot 13 + 4 \cdot 10 = 66 \quad \text{3-D}$$

Readiness
 5.3 B
 5.14 C

5.2 2015 Math STAAR

Problem 4 is an example of testing knowledge of a method of multiplying decimals. This method cannot be used in upper level math. It is fine to use this method/ process as a means to teach a concept, but it should not be tested as content knowledge because it doesn't help the student long term in upper level math. Try to use this method when thousandths or less...

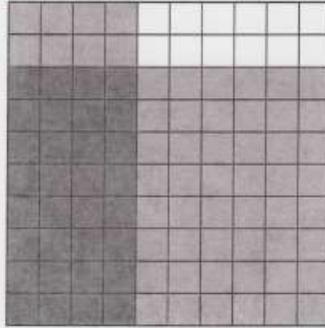
TEK 5.3 D states: (Supporting Content Standard)

- (3) Number and operations. The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to:
 - (D) represent multiplication of decimals with products to the hundredths using objects and pictorial models, including **area models**;

TEK 5.1 B, D & F (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
 - (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;
 - (D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;
 - (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

- 4 The hundredths model in the figure is shaded to represent the multiplying of two numbers.



Area Model
Process

Which equation can be represented by the shaded parts of the model?

- A $80 \times 40 = 3,200$ ✓
- B $0.08 \times 0.04 = 0.32$ ✗
- C $0.80 \times 0.40 = 0.32$ ✓
- D $0.08 \times 0.04 = 0.032$ ✗

Supporting
S.3 D
S.1 B D F

Problem 6 is another example of testing the understanding of pictorial models.

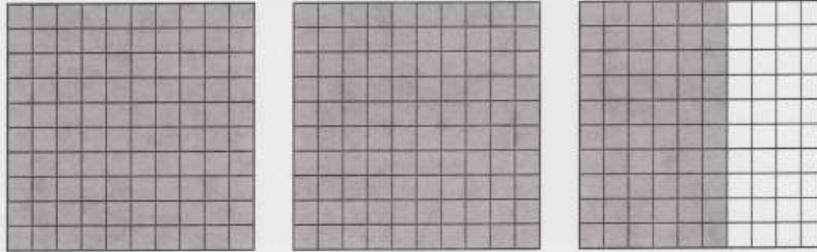
TEK 5.3 F states: (Supporting Content Standard)

- (3) Number and operations. The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to:
- (F) represent quotients of decimals to the hundredths, up to four-digit dividends and two-digit whole number divisors, using objects and **pictorial models**, including area models;

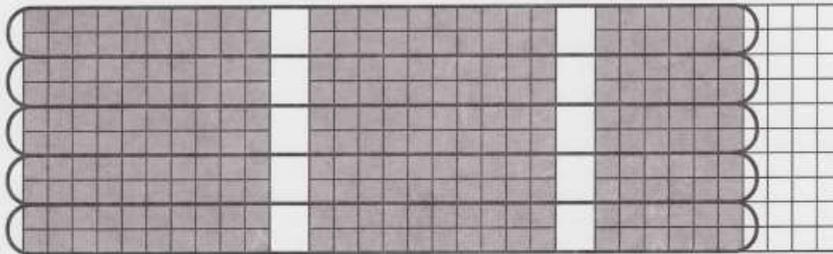
TEK 5.1 B, D & F states: (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
- (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;
- (D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;
- (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

6 The model is shaded to represent two and sixty-hundredths.



This model represents an equation.



Which equation is represented by this model?

- A $2.50 \times 5 = 12.5$
- B $2.60 \div 5 = 0.52$
- C $52 \times 5 = 260$
- D $2.06 \div 5 = 0.412$

This is another example of a process question.

*Supporting
5.3 F
5.1 B OF*

Problem 9 is another example of testing a method or process (using pictorial models or area models).

TEK 5.3 I States: (Supporting Content Standard)

(3) Number and operations. The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to:

(I) represent and solve multiplication of a whole number and a fraction that refers to the same whole using objects and **pictorial models**, including **area models**;

TEK 5.1 A, B, E & F states: (Process Standard)

(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;

(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;

(E) create and use representations to organize, record, and communicate mathematical ideas;

(F) analyze mathematical relationships to connect and communicate mathematical ideas; and

The way the student is taught to solve this problem is to mark out four from each column of six and then count them. They should be taught how to convert the whole number into a fraction, simplify and then multiply the fractions to solve (as I have shown below). I believe that is what TEK 5.3 L covers (see next example, problem 11).

- 9 Weather delayed $\frac{4}{6}$ of the 24 flights departing from an airport. All the departing flights are listed in the chart.

Departing Flights

Flight #48	Flight #111	Flight #90	Flight #38
Flight #112	Flight #222	Flight #134	Flight #46
Flight #23	Flight #564	Flight #56	Flight #116
Flight #12	Flight #72	Flight #765	Flight #677
Flight #17	Flight #86	Flight #89	Flight #422
Flight #65	Flight #329	Flight #88	Flight #499

How many flights departing from the airport were delayed by weather?

- A 18
- B 4
- C 16
- D 8

$$\frac{4}{6} \times \frac{24}{1} = 16$$

Supporting
S.3 I
S.1 A B E F

Problem 11 covers TEK 5.3 L without all of the pictures and models.

TEK 5.3 L states: (Readiness Content Standard)

- (3) Number and operations. The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to:
- (L) divide whole numbers by unit fractions and unit fractions by whole numbers.

TEK 5.1 A, B, & F states: (Process Standard)

- (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;
- (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;
- (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

This is an example of good straight forward problem.

11 Malia had 15 lb of birdseed. She fed her birds $\frac{1}{5}$ lb of birdseed every day until all the birdseed was gone. For how many days did Malia feed the birdseed to her birds?

A 20 days
 B 3 days
 C 90 days
 D 75 days

Readiness
 5.3 L
 5.1 A B F

$$\frac{15 \text{ lb}}{\frac{1}{5} \frac{\text{lb}}{\text{day}}} = \frac{15 \text{ lb}}{1} \times \frac{5 \text{ day}}{1 \text{ lb}}$$

$$\begin{array}{r} 15 \\ \times 5 \\ \hline 75 \end{array}$$

Problem 17 tests TEK 5.9 A.

TEK 5.9 A states: (Supporting Content Standard)

- (9) Data analysis. The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data. The student is expected to:
- (A) represent categorical data with bar graphs or frequency tables and numerical data, including data sets of measurements in fractions or decimals, with dot plots or stem-and-leaf plots;

TEK 5.1 A, B, D & F states: (Process Standard)

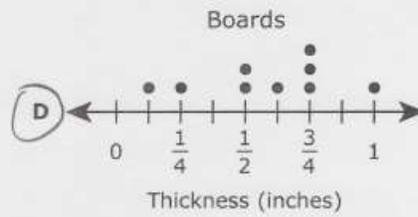
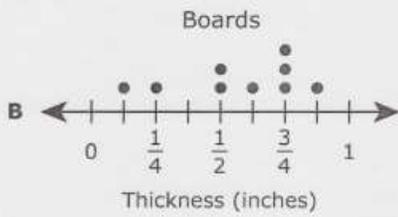
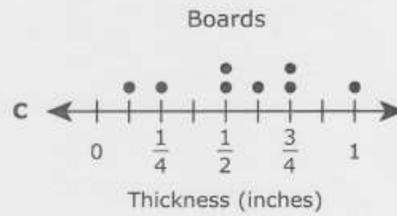
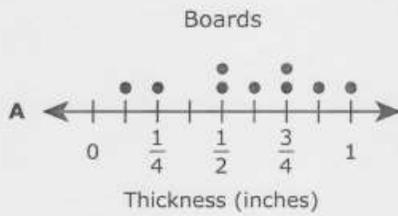
- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
- (A) apply mathematics to problems arising in everyday life, society, and the workplace;
- (B) use a problem-solving model that incorporates 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;
- (D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;
- (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

Why does a TEK go into such specificity to require a student to know how to interpret a dot plot or stem-and-leaf plot?

17 The thicknesses of the boards Dennis used for a construction project are listed below. These measurements are in inches.

$$\frac{1}{4}, \frac{3}{4}, \frac{1}{2}, \frac{3}{4}, \frac{1}{8}, 1, \frac{5}{8}, \frac{3}{4}, \frac{1}{2}$$

Which dot plot represents these measurements?



Supporting
5.9 A
5.1 A B O F

6 STAAR 6TH GRADE MATH QUESTIONS

6.1 2014 Math STAAR

There was nothing unusual found in this assessment.

I will give an example of a clearly worded, good problem. Problem 46 tests TEK 6.2 E. Only problem I found was there is no E on the TEK.

TEK 6.2 states: (Readiness Content Standard)

(6.2) Number, operation, and quantitative reasoning. The student adds, subtracts, multiplies, and divides to solve problems and justify solutions. The student is expected to:

- (A) model addition and subtraction situations involving fractions with objects, pictures, words, and numbers;
- (B) use addition and subtraction to solve problems involving fractions and decimals;
- (C) use multiplication and division of whole numbers to solve problems including situations involving equivalent ratios and rates; and
- (D) estimate and round to approximate reasonable results and to solve problems where exact answers are not required.

TEK 6.11 states: (Process Standard)

(6.11) Underlying processes and mathematical tools. The student applies Grade 6 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school. The student is expected to:

But the problem is a straight forward order of operations problem.

46 There are a total of 950 boxes of shoes at a store.

- Half of the boxes contain athletic shoes.
- Another 125 boxes contain dress shoes.
- Of the remaining boxes of shoes, 4 out of 5 boxes contain sandals.

Based on the expression below, how many boxes at the store contain sandals?

(F) 280

G 355

H 450

J 255

$$4(950 \div 2 - 125) \div 5$$

$$4(475 - 125) \div 5$$

$$4(350) \div 5$$

$$\begin{array}{r} 475 \\ 2 \overline{)950} \\ \underline{-8} \\ 15 \\ \underline{-14} \\ 10 \end{array}$$

$$\begin{array}{r} 475 \\ \underline{-125} \\ 350 \end{array}$$

$$\begin{array}{r} 350 \\ \underline{4} \\ 1400 \end{array}$$

$$\begin{array}{r} 280 \\ 5 \overline{)1400} \\ \underline{-10} \\ 40 \\ \underline{-40} \\ 0 \end{array}$$

Readiness

6.2 E

6.11 A

6.2 2015 Math STAAR

Problem 1 is testing TEK 6.2A

TEK 6.2 A states: (Supporting Content Standard)

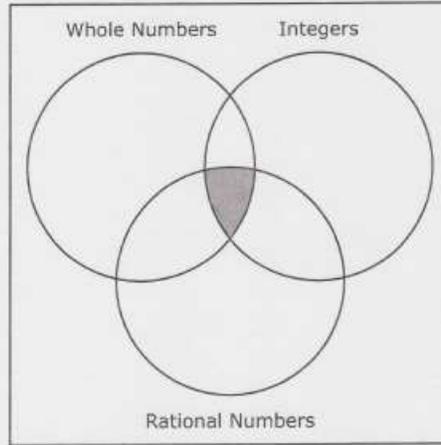
- (2) Number and operations. The student applies mathematical process standards to represent and use rational numbers in a variety of forms. The student is expected to:
- (A) classify whole numbers, integers, and rational numbers using a visual representation such as a **Venn diagram** to describe relationships between sets of numbers;

TEK 6.1 B, E & F (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
- (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;
- (E) create and use representations to organize, record, and communicate mathematical ideas;
- (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

I have never had to use or remember the definition of whole, integer or rational numbers. It is much more important to know how to use these numbers in calculations. Why are we wasting time memorizing classifications of numbers? It seems this question is designed more to test that the student knows what is a Venn diagram...

1 Three sets of numbers are shown in the Venn diagram.



Which of these numbers can be placed in the shaded area of the diagram?

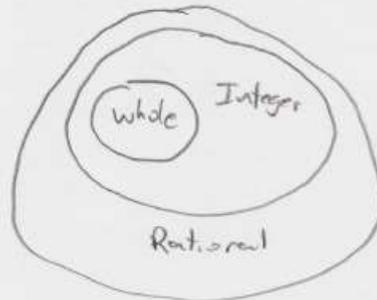
A -5

B 3.5

C $\frac{1}{2}$

D Not here

Supporting
6.2 A
6.1 B E F



Problem 10 is another example of testing a process or method instead of actually performing the calculation. Do 6th graders really need to use a number line to solve $3x-4=-12$?

TEK 6.3 C states: (Supporting Content Standard)

(3) Number and operations. The student applies mathematical process standards to represent addition, subtraction, multiplication, and division while solving problems and justifying solutions. The student is expected to:

(C) represent integer operations with concrete models and connect the actions with the **models** to standardized algorithms;

TEK 6.1 B, E & F (Process Standard)

(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

(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;

(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

(F) analyze mathematical relationships to connect and communicate mathematical ideas; and

Why the emphasis on “model” instead of calculation?

10 Which expression is represented on the number line?

A number line is shown with integers from -12 to 4. Three curved arrows, each labeled '-4', represent jumps starting from 0 and moving left to -4, -8, and -12.

A

B

C

D

Supporting
6.3 C
6.1 B O F

Testing a process, not content knowledge.

7 STAAR 7TH GRADE MATH QUESTIONS

7.1 2014 Math STAAR

Problem 12 is another example of testing a process or method instead of actually performing the calculation. This problem showed up on the 2015 6th grade test. Same question, do students really need to use a number line to solve $4x-5=-20$?

It is clear that some of the method and process questions were in the earlier version of the TEKS and were tested.

TEK 7.2 C states: (Supporting Content Standard)

(7.2) Number, operation, and quantitative reasoning. The student adds, subtracts, multiplies, or divides to solve problems and justify solutions. The student is expected to:

- (C) use **models** to add, subtract, multiply, and divide integers and connect the actions to algorithms;

TEK 7.14 A states: (Process Standard)

(7.14) Underlying processes and mathematical tools. The student communicates about Grade 7 mathematics through informal and mathematical language, representations, and models. The student is expected to:

- (A) communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models; and

12 Which expression is represented by the model below?

F $-4 \cdot (-5)$
G $4 \cdot (-5)$
H $(-4) \cdot 5$
J $4 \cdot 5$

Supporting
7.2c
7.14 A

Problem 18 is another modeling problem that tests the model. At least this one also tests for the correct answer.

TEK 7.5 A states: (Supporting Content Standard)

(7.5) Patterns, relationships, and algebraic thinking. The student uses equations to solve problems. The student is expected to:

(A) use concrete models to solve equations and use symbols to record the actions; and

TEK 7.14 A states: (Process Standard)

(7.14) Underlying processes and mathematical tools. The student communicates about Grade 7 mathematics through informal and mathematical language, representations, and models. The student is expected to:

(A) communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models; and

18 The equation $5w + 3 = 4w + 9$ is modeled below.

What value of w makes this equation true?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

$$\begin{array}{r}
 5w + 3 = 4w + 9 \\
 -4w - 3 \quad -4w - 3 \\
 \hline
 w = 6
 \end{array}$$

Supporting
7.5A
7.14A

7.2 2015 Math STAAR

Problem 11 is testing a process (model) and not content knowledge. These types of models are fine to teach a concept, but students by this grade should be able to use the standard algorithm to quickly solve this problem. That is what should be tested, not that they can recognize a model.

TEK 7.11 A states: (Readiness Content Standard)

- (11) Expressions, equations, and relationships. The student applies mathematical process standards to solve one-variable equations and inequalities. The student is expected to:
- (A) model and solve one-variable, two-step equations and inequalities;

TEK 7.1 B, E & F states: (Process Standard)

- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
- (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;
- (E) create and use representations to organize, record, and communicate mathematical ideas;
- (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

11 The model represents an equation.

What value of x makes the equation true?

(A) 3
 (B) 8
 (C) 6
 (D) 4

Should be this way!

$$2x + 5 = 11$$

$$\begin{array}{r} -5 \\ -5 \end{array}$$

$$\frac{2x}{2} = \frac{6}{2}$$

$$x = 3$$

Readiness
 7.11 A
 7.1 B E F

Testing a process, not content Knowledge.

8 STAAR 8TH GRADE MATH QUESTIONS

8.1 2014 Math STAAR

Problem 14 is a problem where the student calculates volume of a cone. I remembered the volume of a cone, but I figured most students will not so I decided to look at the reference material at the beginning of the test booklet. I was surprised to see an equation that I did not recognize. The TEK being covered is TEK 8.8 C.

TEK 8.8 C states: (Readiness Content Standard)

(8.8) Measurement. The student uses procedures to determine measures of solids. The student is expected to:

(C) estimate answers and use formulas to solve application problems involving surface area and volume.

(8.14) Underlying processes and mathematical tools. The student applies Grade 8 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school. The student is expected to:

(B) use a problem-solving model that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;

The equation listed in the STAAR booklet is:

$$V = \frac{1}{3}Bh$$

But nowhere on the equation page does it say the B is the area of the base... So, a student using the equation page would have to know that for this particular problem B=A (see equation sheet below).

The equation should be printed in the STAAR as follows:

$$V = \frac{1}{3}\pi r^2 h$$

14 A paper drinking cup in the shape of a cone has a height of 10 centimeters and a diameter of 8 centimeters. Which of the following is closest to the volume of the cup in cubic centimeters?

- F 167 cm³
- G 209 cm³
- H 670 cm³
- J 502 cm³



$$V = \frac{1}{3} B h$$

where $B = \pi r^2$

$$V = \frac{1}{3} \pi r^2 h$$

$$V = \frac{1}{3} \pi 4^2 10 = 167.35$$

Readiness
8.8c
8.14 B

VOLUME

Prism or cylinder

$$V = Bh$$

Pyramid or cone

$$V = \frac{1}{3} Bh$$

Sphere

$$V = \frac{4}{3} \pi r^3$$

AREA

Triangle

$$A = \frac{1}{2} bh$$

Rectangle or parallelogram

$$A = bh$$

Trapezoid

$$A = \frac{1}{2} (b_1 + b_2) h$$

Circle

$$A = \pi r^2$$

For 7th grade the equation sheet is just as confusing if not more confusing. B is area of the base and is different for all three equations.

VOLUME			
Triangular prism			$V = Bh$
Rectangular prism			$V = Bh$
Cylinder	$V = \pi r^2 h$	or	$V = Bh$

Problem 38 is a problem to demonstrate the student can estimate; TEK 8.8C.

TEK 8.8 C states: (Readiness Content Standard)

(8.8) Measurement. The student uses procedures to determine measures of solids. The student is expected to:

- (C) estimate answers and use formulas to solve application problems involving surface area and volume.

TEK 8.14 B states: (Process Standard)

(8.14) Underlying processes and mathematical tools. The student applies Grade 8 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school. The student is expected to:

- (B) use a problem-solving model that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;

38 A ball shaped like a sphere has a radius of approximately $2\frac{1}{8}$ inches. Which of the following is the best estimate of the volume of the ball?

F 32 in.³
 G 11 in.³
 H 25 in.³
 J 17 in.³

Handwritten work shows a circle with a radius line and the label $2\frac{1}{8}$. Below it is the calculation:

$$\frac{4}{3}\pi r^3 = \frac{4}{3}\pi \left(\frac{17}{8}\right)^3 = 40.174 \text{ in}^3$$

Further handwritten work shows $\frac{22}{7} \approx 3.14$ and $\text{or } 40.210 \text{ in}^3$.

Readiness
8.8 C
8.14 B

To get the answer that is expected (32 in^3) the student is supposed to reduce $\pi \approx 3.14$ to 3 and radius from 2.125 to 2.0 . If you are looking to narrow the scope of the TEKS, I recommend getting rid of estimation as the precision and accuracy of calculating the answer is much better.

8.2 2015 Math STAAR

Problem 1 is testing TEK 8.2 A.

TEK 8.2 A states: (Supporting Content Standard)

- (2) Number and operations. The student applies mathematical process standards to represent and use real numbers in a variety of forms. The student is expected to:
 - (A) extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of real numbers;
- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
 - (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;
 - (E) create and use representations to organize, record, and communicate mathematical ideas;
 - (G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

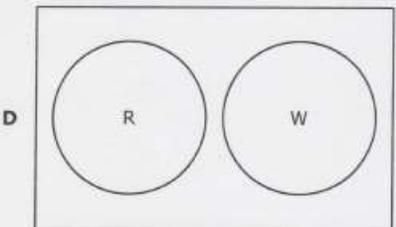
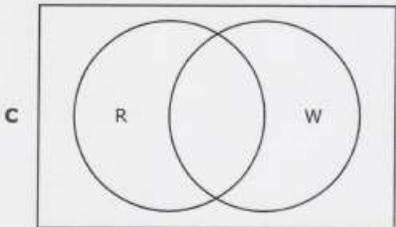
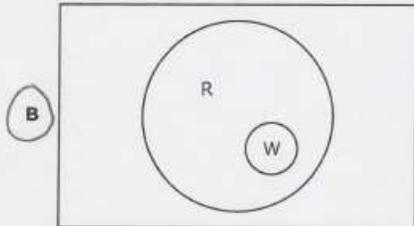
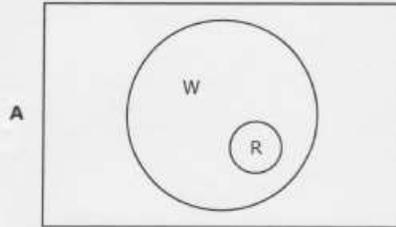
This is another example of a TEK that is just not all that useful in the real world. Every single STAAR practice test started with this very question of Venn diagrams and definition/ classification of numbers. Every student I gave it too was immediately discouraged because who remembers the definition of real, integer, whole, counting (this is a new category they added since I went to school), imaginary, rational, irrational and natural?

Can any one of the math experts give me a real word example of the use or need to know the definition of these numbers?

1 Which Venn diagram correctly describes the relationship between Set R and Set W?

R = {real numbers}
W = {whole numbers}

Supporting
8.2 A
8.1 B E G



Problem 6 is testing TEK 8.5G.

TEK 8.5 G states: (Readiness Content Standard)

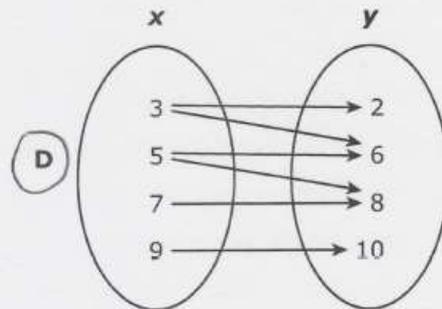
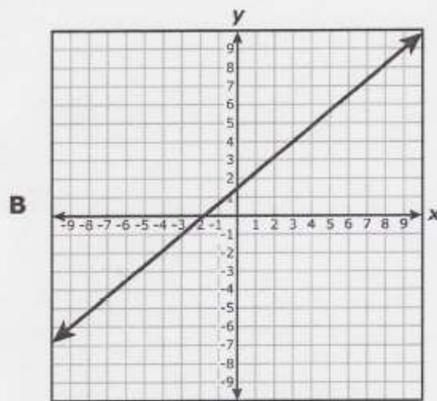
- (5) Proportionality. The student applies mathematical process standards to use proportional and non-proportional relationships to develop foundational concepts of functions. The student is expected to:
- (1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
- (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;
 - (E) create and use representations to organize, record, and communicate mathematical ideas;
 - (F) analyze mathematical relationships to connect and communicate mathematical ideas; and

6 Which representation does **not** show y as a function of x ?

A

x	1	3	5	7
y	-6	-18	-30	-42

C $\{(2, -2), (3, -2), (7, -2), (11, -2)\}$



Readiness

8.5 G

8.1 B E F

This problem is an example of the deeper conceptual understanding that the new TEKS are trying to provide, but can anyone tell me what is the practical application of the answer of this problem?

This problem is testing if the student can understand the definition of a function in a diagram format; each input (also known as domain) can only have one output (also known as codomain or range).