

STAAR CONNECTION™

Diagnostic Series™

Math
4
teacher
v3



KAMICO®
Instructional Media, Inc.

STAAR CONNECTION™

Math 4 teacher

Diagnostic Series™

XXVII/vii/MMXXIII
Version 3



KAMICO®

Instructional Media, Inc.

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KAMICO® Instructional Media, Inc.
STAAR CONNECTION™
Introduction

KAMICO® Instructional Media's program is validated by scientifically based research. **STAAR CONNECTION™ Diagnostic Series™** and **Developmental Series™** can be used in tandem to ensure mastery of Texas reporting categories and TEKS. The *Diagnostic Series™* consists of a bank of assessments. Each assessment covers a mixture of reporting categories and TEKS. This research-based format provides continual reinforcement for and ensures retention of mastered concepts. To take full advantage of this series, administer an assessment to students. After they have completed the assessment, use it as an instructional tool. Go over each item with the class, discussing all correct and incorrect answers. Then, use the assessment as a diagnostic tool to determine a standard for which students need remediation. Find that standard in the *Developmental Series™*.

Each book in the *STAAR CONNECTION Developmental Series™* consists of isolated activities and assessments to allow for the development of specific TEKS. For every TEKS, there is at least one individual or group activity. The activities provide a fun, challenging, yet nonthreatening, way to develop mastery of the TEKS. In addition to these activities, each *Developmental Series™* book has assessments on isolated standards to be used to identify mastery or the need for further skill development or reinforcement. Continue to alternate between the *STAAR CONNECTION™ Diagnostic Series™* and the *Developmental Series™*.

KAMICO's **DATA CONNECTION®** software prints student answer sheets on plain paper using a standard laser printer, scans answer sheets using a TWAIN-compliant scanner, scores assessments, and disaggregates student academic data, showing which goals and objectives are mastered and which goals and objectives are in need of reinforcement. The software is preprogrammed to work with all KAMICO® assessments. It is easily customized to work with other instructional materials and assessments as well as teacher-, school-, district-, or state-created assessments. **DATA CONNECTION®** analyzes academic data from individual students, classes, grade levels, and demographic groups. Reports are presented in tabular and graphic form. Item analysis is provided to help determine the most effective method of instruction.

KAMICO® Instructional Media, Inc., supports efforts to ensure adequate yearly progress and eliminate surprises in high-stakes test results.

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KAMICO® Instructional Media, Inc.
STAAR CONNECTION™
Diagnostic Series™
Grade 4 Math
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Reporting Categories and Related TEKS Grade 4 Mathematics

Mathematical Process Standards

These student expectations will not be listed under a separate reporting category. Instead, they will be incorporated into test questions across reporting categories since the application of mathematical process standards is part of each knowledge statement.

- (4.1) **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.

Reporting Category 1: Numerical Representations and Relationships

The student will demonstrate an understanding of how to represent and manipulate numbers and expressions.

- (4.2) **Number and operations.** The student applies mathematical process standards to represent, compare, and order whole numbers and decimals and understand relationships related to place value. The student is expected to
- (A) interpret the value of each place-value position as 10 times the position to the right and as one-tenth of the value of the place to its left; **Supporting Standard**
 - (B) represent the value of the digit in whole numbers through 1,000,000,000 and decimals to the hundredths using expanded notation and numerals; **Readiness Standard**
 - (C) compare and order whole numbers to 1,000,000,000 and represent comparisons using the symbols $>$, $<$, or $=$; **Supporting Standard**
 - (D) round whole numbers to a given place value through the hundred thousands place; **Supporting Standard**
 - (E) represent decimals, including tenths and hundredths, using concrete and visual models and money; **Supporting Standard**
 - (F) compare and order decimals using concrete and visual models to the hundredths; **Supporting Standard**
 - (G) relate decimals to fractions that name tenths and hundredths; and **Readiness Standard**
 - (H) determine the corresponding decimal to the tenths or hundredths place of a specified point on a number line. **Supporting Standard**
- (4.3) **Number and operations.** The student applies mathematical process standards to represent and generate fractions to solve problems. The student is expected to
- (A) represent a fraction a/b as a sum of fractions $1/b$, where a and b are whole numbers and $b > 0$, including when $a > b$; **Supporting Standard**

- (B) decompose a fraction in more than one way into a sum of fractions with the same denominator using concrete and pictorial models and recording results with symbolic representations;
Supporting Standard
- (C) determine if two given fractions are equivalent using a variety of methods; **Supporting Standard**
- (D) compare two fractions with different numerators and different denominators and represent the comparison using the symbols $>$, $=$, or $<$; and **Readiness Standard**
- (G) represent fractions and decimals to the tenths or hundredths as distances from zero on a number line. **Supporting Standard**

Reporting Category 2: Computations and Algebraic Relationships

The student will demonstrate an understanding of how to perform operations and represent algebraic relationships.

- (4.3) **Number and operations.** The student applies mathematical process standards to represent and generate fractions to solve problems. The student is expected to
 - (E) represent and solve addition and subtraction of fractions with equal denominators using objects and pictorial models that build to the number line and properties of operations; and
Readiness Standard
 - (F) evaluate the reasonableness of sums and differences of fractions using benchmark fractions 0, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, and 1, referring to the same whole. **Supporting Standard**
- (4.4) **Number and operations.** The student applies mathematical process standards to develop and use strategies and methods for whole number computations and decimal sums and differences in order to solve problems with efficiency and accuracy. The student is expected to
 - (A) add and subtract whole numbers and decimals to the hundredths place using the standard algorithm; **Readiness Standard**
 - (B) determine products of a number and 10 or 100 using properties of operations and place value understandings; **Supporting Standard**

- (C) represent the product of 2 two-digit numbers using arrays, area models, or equations, including perfect squares through 15 by 15;
Supporting Standard
 - (D) use strategies and algorithms, including the standard algorithm, to multiply up to a four-digit number by a one-digit number and to multiply a two-digit number by a two-digit number. Strategies may include mental math, partial products, and the commutative, associative, and distributive properties; **Supporting Standard**
 - (E) represent the quotient of up to a four-digit whole number divided by a one-digit whole number using arrays, area models, or equations;
Supporting Standard
 - (F) use strategies and algorithms, including the standard algorithm, to divide up to a four-digit dividend by a one-digit divisor;
Supporting Standard
 - (G) round to the nearest 10, 100, or 1,000 or use compatible numbers to estimate solutions involving whole numbers; and
Supporting Standard
 - (H) solve with fluency one- and two-step problems involving multiplication and division, including interpreting remainders.
Readiness Standard
- (4.5) **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; and **Readiness Standard**
 - (B) represent problems using an input-output table and numerical expressions to generate a number pattern that follows a given rule representing the relationship of the values in the resulting sequence and their position in the sequence. **Readiness Standard**

Reporting Category 3: Geometry and Measurement:

The student will demonstrate an understanding of how to represent and apply geometry and measurement concepts.

- (4.5) **Algebraic reasoning.** The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to
- (D) solve problems related to perimeter and area of rectangles where dimensions are whole numbers. **Readiness Standard**
- (4.6) **Geometry and measurement.** The student applies mathematical process standards to analyze geometric attributes in order to develop generalizations about their properties. The student is expected to
- (A) identify points, lines, line segments, rays, angles, and perpendicular and parallel lines; **Supporting Standard**
 - (B) identify and draw one or more lines of symmetry, if they exist, for a two-dimensional figure; **Supporting Standard**
 - (C) apply knowledge of right angles to identify acute, right, and obtuse triangles; and **Supporting Standard**
 - (D) classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines or the presence or absence of angles of a specified size. **Readiness Standard**
- (4.7) **Geometry and measurement.** The student applies mathematical process standards to solve problems involving angles less than or equal to 180 degrees. The student is expected to
- (C) determine the approximate measures of angles in degrees to the nearest whole number using a protractor; **Readiness Standard**
 - (D) draw an angle with a given measure; and **Supporting Standard**
 - (E) determine the measure of an unknown angle formed by two non-overlapping adjacent angles given one or both angle measures. **Supporting Standard**

- (4.8) **Geometry and measurement.** The student applies mathematical process standards to select appropriate customary and metric units, strategies, and tools to solve problems involving measurement. The student is expected to
- (A) identify relative sizes of measurement units within the customary and metric systems; **Supporting Standard**
 - (B) convert measurements within the same measurement system, customary or metric, from a smaller unit into a larger unit or a larger unit into a smaller unit when given other equivalent measures represented in a table; and **Supporting Standard**
 - (C) solve problems that deal with measurements of length, intervals of time, liquid volumes, mass, and money using addition, subtraction, multiplication, or division as appropriate. **Readiness Standard**

Reporting Category 4: Data Analysis and Personal Financial Literacy

The student will demonstrate an understanding of how to represent and analyze data and how to describe and apply personal financial concepts.

- (4.9) **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 data on a frequency table, dot plot, or stem-and-leaf plot marked with whole numbers and fractions; and **Readiness Standard**
 - (B) solve one- and two-step problems using data in whole number, decimal, and fraction form in a frequency table, dot plot, or stem-and-leaf plot. **Supporting Standard**
- (4.10) **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) distinguish between fixed and variable expenses; **Supporting Standard**
 - (B) calculate profit in a given situation; and **Supporting Standard**
 - (E) describe the basic purpose of financial institutions, including keeping money safe, borrowing money, and lending. **Supporting Standard**

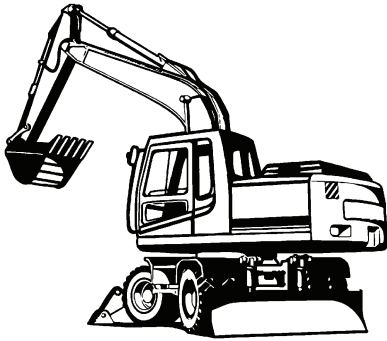
Name _____

Date _____

DIRECTIONS

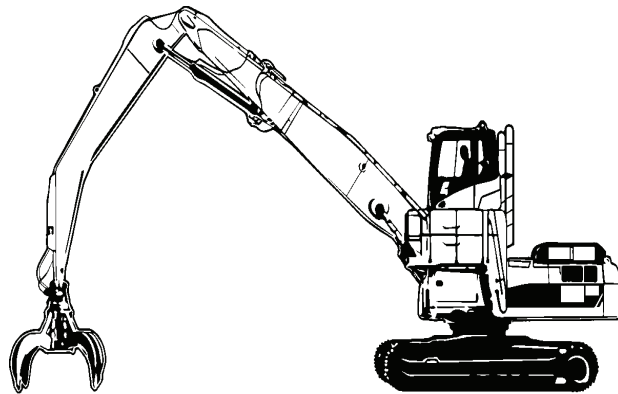
Read each question carefully. Choose the best answer to each question. For open-response questions, determine the best answer to the question.

- 1** Darren's dad owns an excavation company. He is considering buying two new pieces of heavy equipment. Record the swing torque in the box below each piece of equipment.



Excavator

pounds per foot



Material Handler

pounds per foot

On the manufacturer's website, the swing torque of an excavator is listed as 80,394 pounds per foot, with a swing speed of 9 RPMs. The swing torque of the material handler is listed as 104,070 pounds per foot, with a swing speed of 10 RPMs. Round the swing torque of the excavator and the material handler to the ten thousands place. Record your answers in the spaces provided.

Excavator

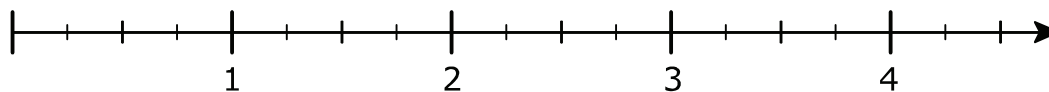
Material Handler

- 2 Darlene is making spaghetti and sauce. Her ingredient list for the spaghetti and sauce follows:

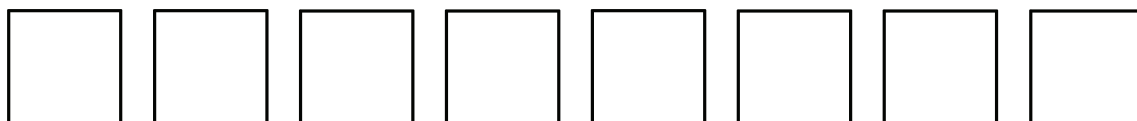
1 lb ground beef
1 large onion, chopped
2 cans (15 oz each) tomato sauce
1 clove garlic, minced
1 bay leaf
1 tablespoon minced fresh basil
$\frac{3}{4}$ teaspoon dried oregano
$1\frac{1}{2}$ teaspoons salt
1 teaspoon sugar
$\frac{1}{2}$ teaspoon pepper
hot cooked spaghetti

Darlene never pays attention to exact measurements when she adds spices.

When she adds the oregano, she adds between $\frac{3}{4}$ and $1\frac{1}{2}$ teaspoons. On the number line below, show all the measurements between $\frac{3}{4}$ and $1\frac{1}{2}$.



- 3** Suzy is building a doll house. She has 8 square pieces of wood.



Suzy uses 4 of the pieces of wood to make the living room walls. She uses another 3 pieces to add the dining room by attaching 2 of the pieces to one of the living room walls. Which shows how to find the fraction of the square pieces of wood that Suzy has left to work with?

(A) $\frac{8}{8} - \frac{3}{8} = \frac{5}{8}$

Suzy has five of the eight pieces of wood left to work with.

(B) $\frac{8}{8} - \frac{2}{8} = \frac{6}{8}$

Suzy has six of the eight pieces of wood left to work with.

(C) $\frac{8}{8} - \frac{4}{8} = \frac{4}{8}; \frac{4}{8} - \frac{3}{8} = \frac{1}{8}$

Suzy has one of the eight pieces of wood left to work with.

(D) $\frac{8}{8} - \frac{3}{8} = \frac{5}{8}; \frac{5}{8} - \frac{2}{8} = \frac{3}{8}$

Suzy has three of the eight pieces of wood left to work with.

-
- 4** Inks Lake is the smallest of the Highland Lakes. The surface area of Inks Lake is 831 acres. Lake LBJ is another Highland Lake. Lake LBJ's surface area is 6,534 acres. If there are 4 fishermen in Lake LBJ for every 6 acres of surface area, how many fishermen are on the lake? Record your answer in the space provided.

A large, empty rectangular box with a black border, intended for the student to write their answer to question 4.

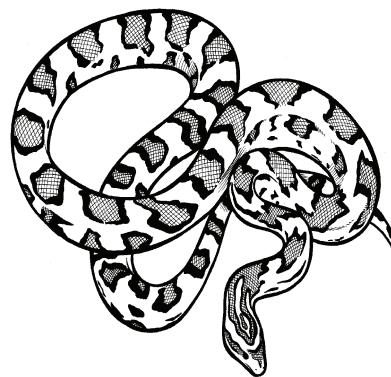
- 5** Martha wants to be a healthy eater. She buys almost no processed foods. When she goes to the grocery store, she shops the walls. This is where she finds fresh meat, eggs, dairy, nuts, fruits, and vegetables. The walls of her favorite grocery store form a rectangle. Its total perimeter is 886 feet. The length of one side of the store is 226 feet. What is the width of the grocery store? Record your answer in the space provided.



226 feet



- 6** Darlene just got a baby corn snake. She named her Mazy. Darlene is keeping Mazy in a 10-gallon aquarium, but as Mazy grows, Darlene will have to move her into at least a 20-gallon aquarium. Right now, Mazy is 7 inches long. Over the next 3 to 4 years, Mazy can grow to 70 inches long. If Mazy reaches a length of 60 inches, how long will she be, in feet? Record your answer in the space provided.

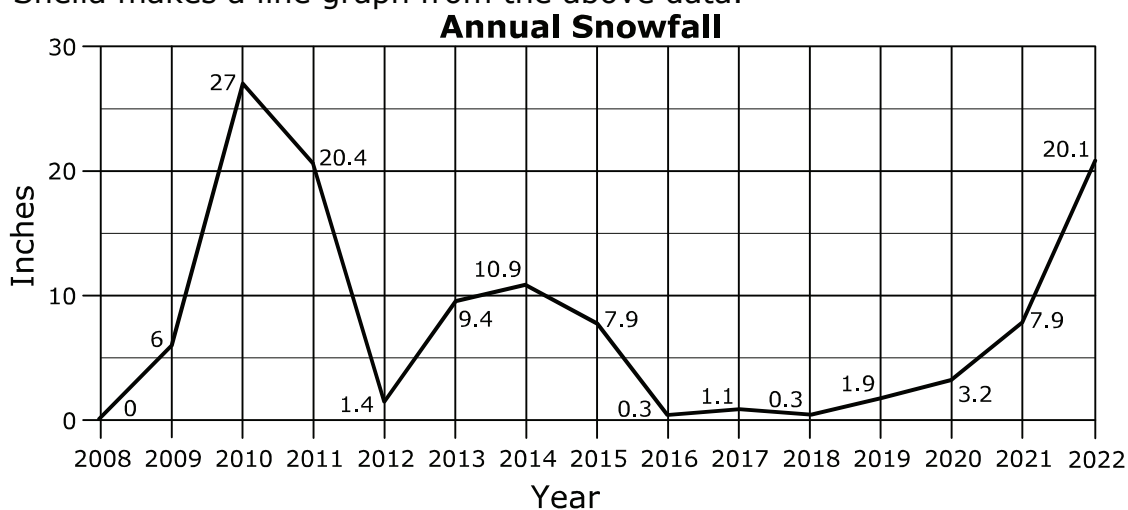


- 7 Sheila wants to go to college at the University of Arkansas in Fayetteville, Arkansas. She looks up Fayetteville's annual snowfall since 2008.

Annual Snowfall Table

Year	Snowfall (in inches)
2008	0.0
2009	6.0
2010	27.0
2011	20.4
2012	1.4
2013	9.4
2014	10.9
2015	7.9
2016	0.3
2017	1.1
2018	0.3
2019	1.9
2020	3.2
2021	7.9
2022	20.1

Sheila makes a line graph from the above data.



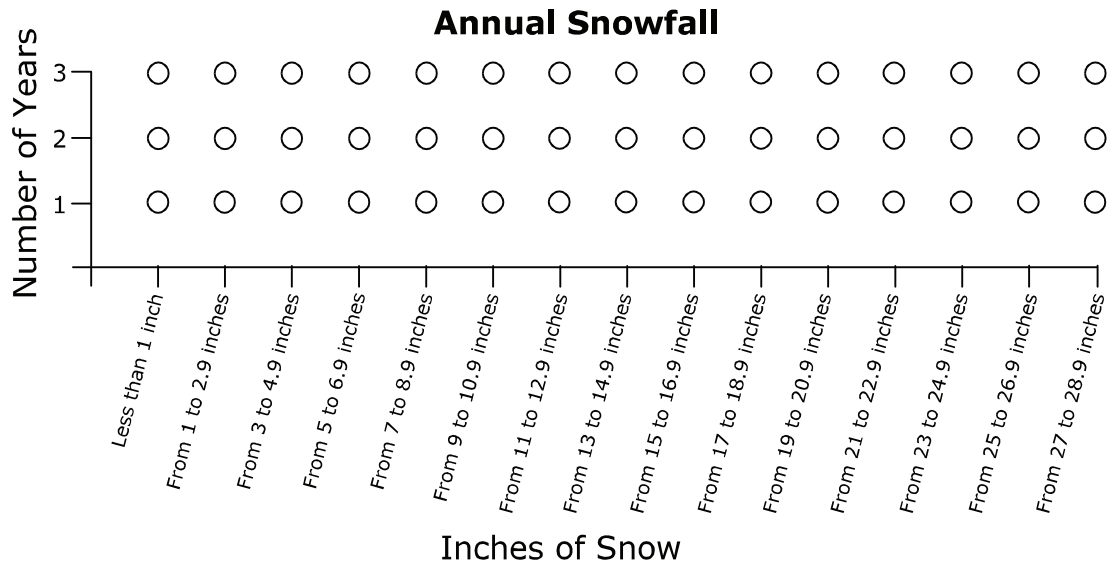
Next, Sheila makes a stem-and-leaf plot from data in the table.

Inches of Snow	
Stem	Leaf
0	0 3 3
1	4 1 9
3	2
6	0
7	9 9
9	4
10	9
20	4 1
27	0
key: 2 5 means 2.5	

After this, Sheila makes a frequency table from data in the table.

Annual Snowfall		
Inches	Tally	Frequency
Less than 1	///	3
From 1 to 2.9	///	3
From 3 to 4.9	/	1
From 5 to 6.9	/	1
From 7 to 8.9	//	2
From 9 to 10.9	//	2
From 11 to 12.9		0
From 13 to 14.9		0
From 15 to 16.9		0
From 17 to 18.9		0
From 19 to 20.9	//	2
From 21 to 22.9		0
From 23 to 24.9		0
From 25 to 26.9		0
From 27 to 28.9	/	1

Last, Sheila makes a dot plot that accurately displays the data. Complete the dot plot by shading the circles to show data from the table.



- 8** Cameron earns an allowance of \$60 a week. From his allowance, Cameron pays for his car's gasoline. Cameron drives back and forth to his high school every day. He picks up his little sister Olivia from her school. He also attends a junior college, which adds about 200 miles a week to the miles he drives. Cameron uses about a tank of gas a week. Although he fills his car's tank at the same station, the price per gallon often changes on

a daily basis. The cost of Cameron's gas is a

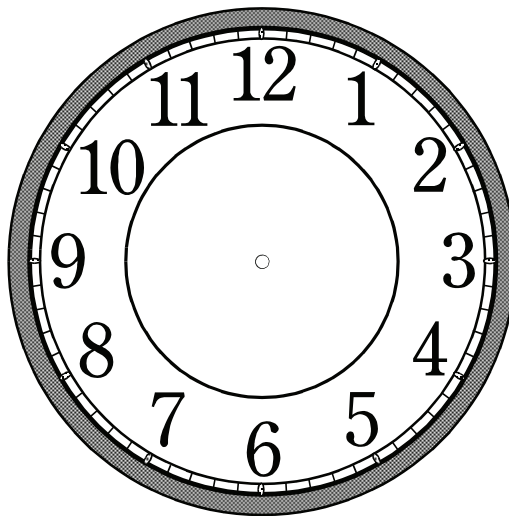
- (A) fixed
(B) variable

expense. How do you know?

- (A) Cameron always goes to the same station and always fills his car's gas tank.
- (B) Cameron drives over 200 miles a week.
- (C) Gas is not the same price every week.
- (D) Sometimes Cameron stays and works out after school in the school gym.

- 9** At 6:00 p.m., Isabel finished studying. She studied math for 45 minutes and science for 40 minutes. Between subjects, she took a 20-minute break. If Isabel did not have any interruptions, at what time did she start studying? Record your answer in the space provided.

Draw the hands on the clock to show the time Isabel started studying.



- 10** The largest drum set known to exist belongs to Dr. Mark Temperato. The set consists of 813 pieces. It takes 4 people more than 20 hours to set it up. How many minutes are in 20 hours? Record your answer in the space below.

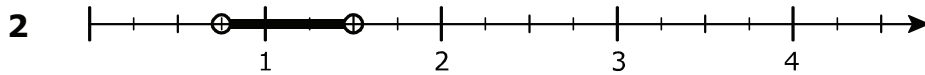
BE SURE YOU HAVE RECORDED ALL OF YOUR ANSWERS
IN THE TEST BOOKLET.



STAAR CONNECTION™
Diagnostic Series™
Grade 4 Math
Answer Key

Assessment 1

	Excavator	Material Handler
1	80,394 pounds per foot	104,070 pounds per foot
	80,000 Excavator	100,000 Material Handler



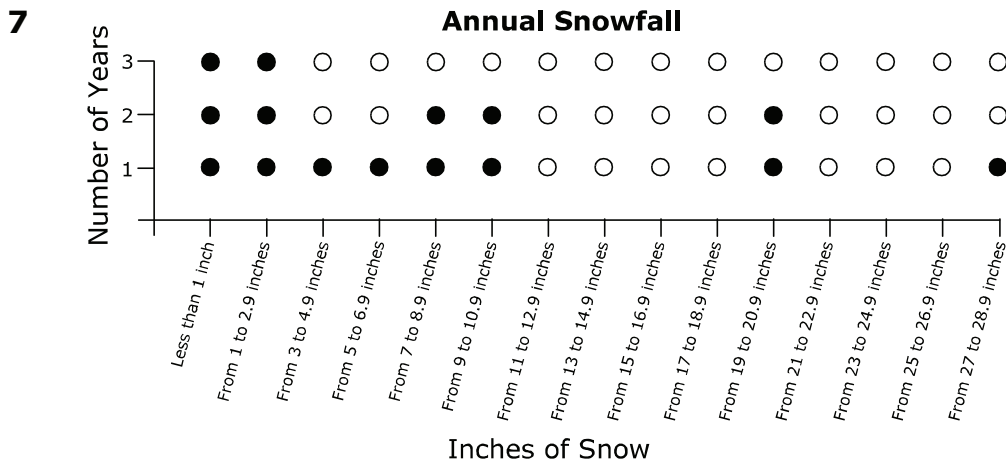
3 Ⓒ $\frac{8}{8} - \frac{4}{8} = \frac{4}{8}; \frac{4}{8} - \frac{3}{8} = \frac{1}{8}$

Suzy has one of the eight pieces of wood left to work with.

4 4,356 fishermen

5 217 feet

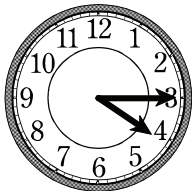
6 5 feet



8 The cost of Cameron's gas is a
☐ A fixed
☒ variable
 expense.

Ⓒ Gas is not the same price every week.

9 4:15 p.m.



10 1,200 min

Student
Name:

STAAR CONNECTION™
Grade 4
Diagnostic Series Math

The following charts provide each assessment question number along with the corresponding reporting category, identification of readiness or supporting standard, content student expectation, and process student expectation.

Circle the number of any question that has been answered incorrectly. Circle the TEKS that need additional reinforcement.

Assessment 1				
Item Number	Reporting Category	Readiness or Supporting	Content Student Expectation (TEKS)	Process Student Expectation (TEKS)
1	1	Supporting	4.2D	4.1C
2	1	Supporting	4.3G	4.1D
3	2	Readiness	4.3E	4.1G
4	2	Supporting	4.4F	4.1B
5	3	Readiness	4.5D	4.1B
6	3	Supporting	4.8B	4.1A
7	4	Readiness	4.9A	4.1D
8	4	Supporting	4.10A	4.1A
9	3	Readiness	4.8C	4.1A
10	3	Supporting	4.8B	4.1A