

# STAAR CONNECTION™

## Diagnostic Series™

Math  
**3**  
teacher  
v3



**KAMICO®**  
Instructional Media, Inc.

# STAAR CONNECTION™

Math  
**3**  
teacher

## Diagnostic Series™

IX/viii/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 3 Math**  
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## **Grade 3 Mathematics Reporting Categories and Related TEKS**

### **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.**

- (3.1) **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.

- (3.2) **Number and operations.** The student applies mathematical process standards to represent and compare whole numbers and understand relationships related to place value. The student is expected to
- (A) 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;  
**Readiness Standard**
  - (B) describe the mathematical relationships found in the base-10 place value system through the hundred thousands place;  
**Supporting Standard**
  - (C) represent a number on a number line as being between two consecutive multiples of 10; 100; 1,000; or 10,000 and use words to describe relative size of numbers in order to round whole numbers; and **Supporting Standard**
  - (D) compare and order whole numbers up to 100,000 and represent comparisons using the symbols  $>$ ,  $<$ , or  $=$ . **Readiness Standard**
- (3.3) **Number and operations.** The student applies mathematical process standards to represent and explain fractional units. The student is expected to
- (A) 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;  
**Supporting Standard**
  - (B) 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; **Supporting Standard**
  - (C) explain that the unit fraction  $1/b$  represents the quantity formed by one part of a whole that has been partitioned into  $b$  equal parts where  $b$  is a non-zero whole number; **Supporting Standard**

(D) 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  $1/b$ ;

**Supporting Standard**

(E) 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;

**Supporting Standard**

(F) represent equivalent fractions with denominators of 2, 3, 4, 6, and 8 using a variety of objects and pictorial models, including number lines; **Readiness Standard**

(G) 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; and

**Supporting Standard**

(H) compare two fractions having the same numerator or denominator in problems by reasoning about their sizes and justifying the conclusion using symbols, words, objects, and pictorial models.

**Readiness Standard**

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

(I) determine if a number is even or odd using divisibility rules.

**Supporting Standard**

(3.7) **Geometry and measurement.** The student applies mathematical process standards to select appropriate units, strategies, and tools to solve problems involving customary and metric measurement. The student is expected to

(A) represent fractions of halves, fourths, and eighths 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.

- (3.4) **Number and operations.** The student applies mathematical process standards to develop and use strategies and methods for whole number computations in order to solve problems with efficiency and accuracy. The student is expected to
- (A) 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; **Readiness Standard**
  - (B) round to the nearest 10 or 100 or use compatible numbers to estimate solutions to addition and subtraction problems; **Supporting Standard**
  - (D) determine the total number of objects when equally sized groups of objects are combined or arranged in arrays up to 10 by 10; **Supporting Standard**
  - (E) represent multiplication facts by using a variety of approaches such as repeated addition, equal-sized groups, arrays, area models, equal jumps on a number line, and skip counting; **Supporting Standard**
  - (F) recall facts to multiply up to 10 by 10 with automaticity and recall the corresponding division facts; **Supporting Standard**
  - (G) use strategies and algorithms, including the standard algorithm, to multiply a two-digit number by a one-digit number. Strategies may include mental math, partial products, and the commutative, associative, and distributive properties; **Supporting Standard**
  - (H) determine the number of objects in each group when a set of objects is partitioned into equal shares or a set of objects is shared equally; **Supporting Standard**
  - (J) determine a quotient using the relationship between multiplication and division; and **Supporting Standard**
  - (K) solve one-step and two-step problems involving multiplication and division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recall of facts. **Readiness Standard**



- (3.5) **Algebraic reasoning.** The student applies mathematical process standards to analyze and create patterns and relationships. The student is expected to
- (A) represent one- and two-step problems involving addition and subtraction of whole numbers to 1,000 using pictorial models, number lines, and equations; **Readiness Standard**
  - (B) represent and solve one- and two-step multiplication and division problems within 100 using arrays, strip diagrams, and equations; **Readiness Standard**
  - (C) describe a multiplication expression as a comparison such as  $3 \times 24$  represents 3 times as much as 24; **Supporting Standard**
  - (D) determine the unknown whole number in a multiplication or division equation relating three whole numbers when the unknown is either a missing factor or product; and **Supporting Standard**
  - (E) represent real-world relationships using number pairs in a table and verbal descriptions. **Readiness Standard**

### **Reporting Category 3: Geometry and Measurement**

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

- (3.6) **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
- (A) 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;  
**Readiness Standard**
  - (B) 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; **Supporting Standard**
  - (C) 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; **Readiness Standard**
  - (D) decompose composite figures formed by rectangles into non-overlapping rectangles to determine the area of the original figure using the additive property of area; and **Supporting Standard**
  - (E) decompose two congruent two-dimensional figures into parts with equal areas and express the area of each part as a unit fraction of the whole and recognize that equal shares of identical wholes need not have the same shape. **Supporting Standard**
- (3.7) **Geometry and measurement.** The student applies mathematical process standards to select appropriate units, strategies, and tools to solve problems involving customary and metric measurement. The student is expected to
- (B) determine the perimeter of a polygon or a missing length when given perimeter and remaining side lengths in problems;  
**Readiness Standard**
  - (C) determine the solutions to problems involving addition and subtraction of time intervals in minutes using pictorial models or tools such as a 15-minute event plus a 30-minute event equals 45 minutes;  
**Supporting Standard**
  - (D) determine when it is appropriate to use measurements of liquid volume (capacity) or weight; and **Supporting Standard**
  - (E) determine liquid volume (capacity) or weight using appropriate units and tools. **Supporting 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.**

- (3.4) **Number and operations.** The student applies mathematical process standards to develop and use strategies and methods for whole number computations in order to solve problems with efficiency and accuracy. The student is expected to
- (C) determine the value of a collection of coins and bills.  
**Supporting Standard**
- (3.8) **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  
**Readiness Standard**
  - (B) solve one- and two-step problems using categorical data represented with a frequency table, dot plot, pictograph, or bar graph with scaled intervals. **Supporting Standard**
- (3.9) **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) explain the connection between human capital/labor and income;  
**Supporting Standard**
  - (B) describe the relationship between the availability or scarcity of resources and how that impacts cost; **Supporting Standard**
  - (D) explain that credit is used when wants or needs exceed the ability to pay and that it is the borrower's responsibility to pay it back to the lender, usually with interest; and **Supporting Standard**
  - (E) list reasons to save and explain the benefit of a savings plan, including for college. **Supporting Standard**

Name \_\_\_\_\_

Date \_\_\_\_\_

**DIRECTIONS**

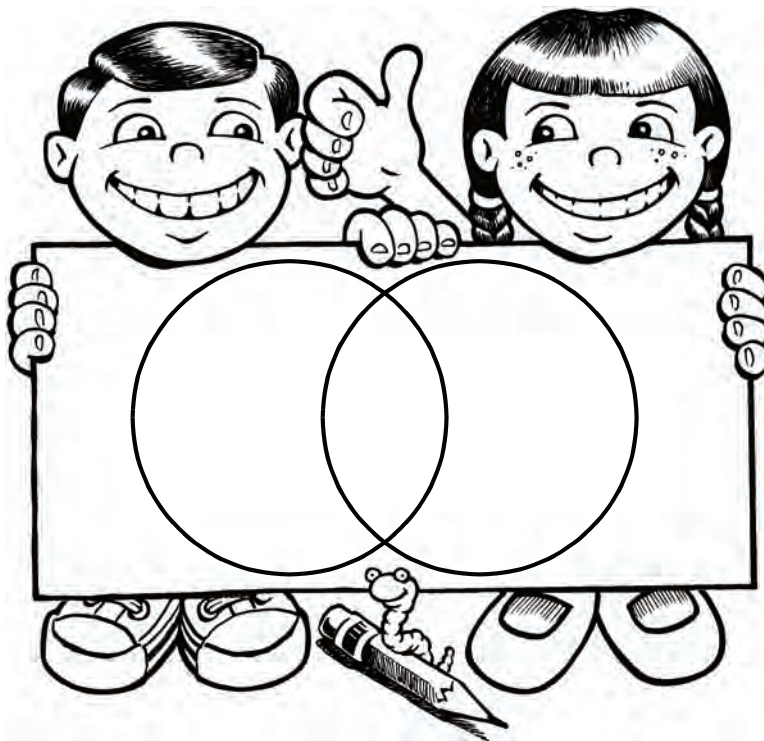
**Read each question carefully. Choose the best answer to each question. For open-response questions, determine the best answer to the question.**

- 1 Sid and Kim have 9 cookies.



They are going to share the cookies equally.

Fill in the diagram to show how Sid and Kim share the cookies.



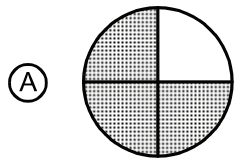
What fraction of the cookies does each student get?

Record your answer in the space.

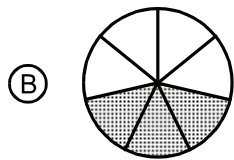
How many cookies will each student get?

- |                    |                    |
|--------------------|--------------------|
| (A) 3              | (C) 4              |
| (B) $3\frac{1}{2}$ | (D) $4\frac{1}{2}$ |

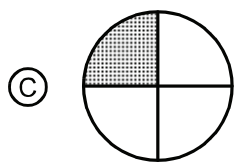
- 2 Some ice cream is  $\frac{3}{4}$  air. Which answer shows a model that is shaded to represent the unit fraction  $\frac{1}{4}$ , the part of the ice cream that is **not** air, and explains why the model is correct?



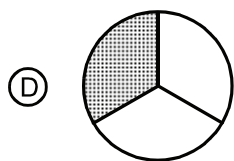
The circle is divided into 4 equal parts, and 3 of those parts are shaded.



The circle is divided into 7 equal parts, and 3 of those parts are shaded.



The circle is divided into 4 equal parts, and 1 of those parts is shaded.



The circle is divided into 3 equal parts, and 1 of those parts is shaded.

**Bonus:** Draw a model that is shaded to represent the fraction  $\frac{1}{6}$ .

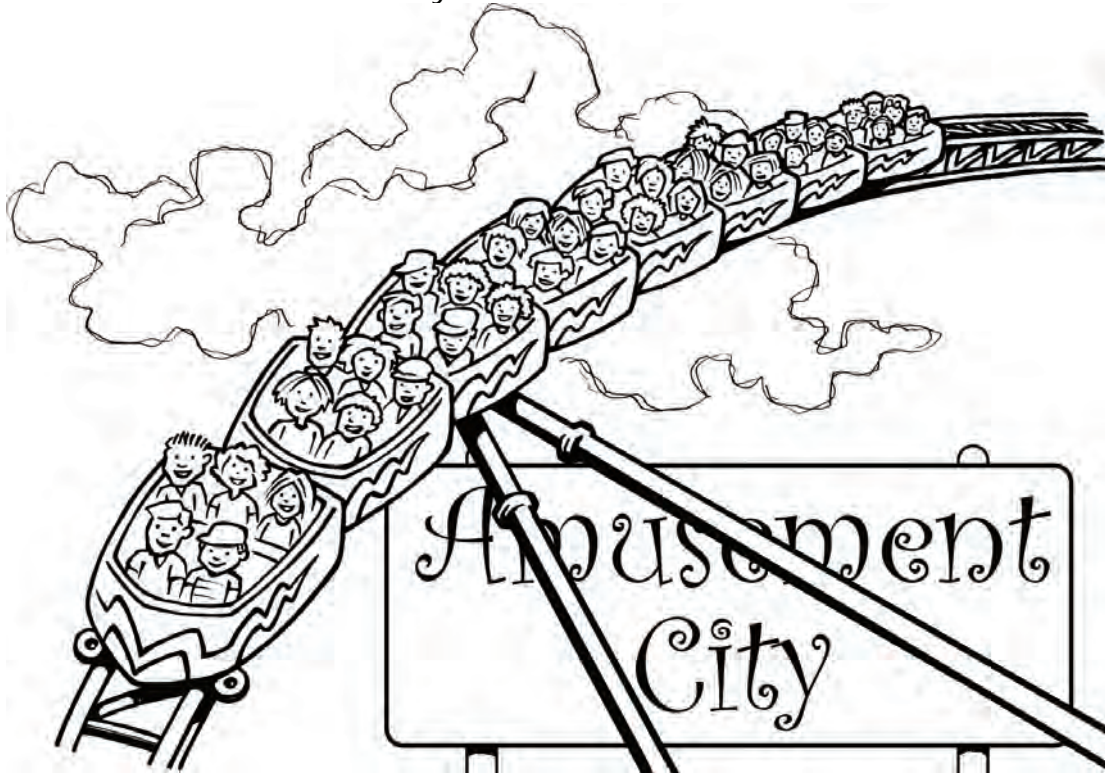
Write the number of equal parts.

Write the number of parts that must be shaded.

Draw your model.

Explain why your model is correct. Record your answer in the space below.

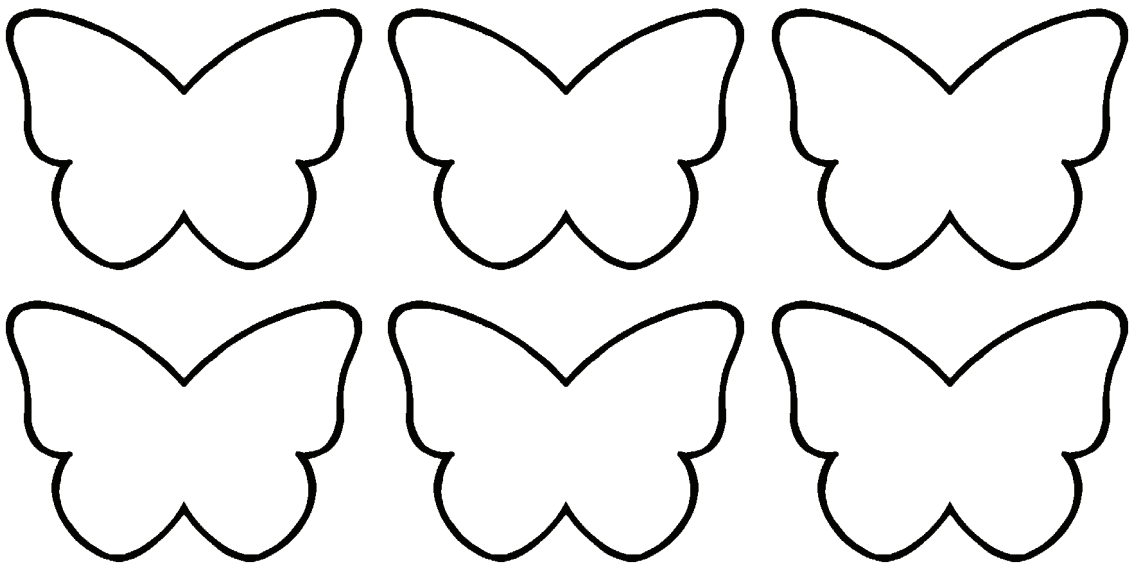
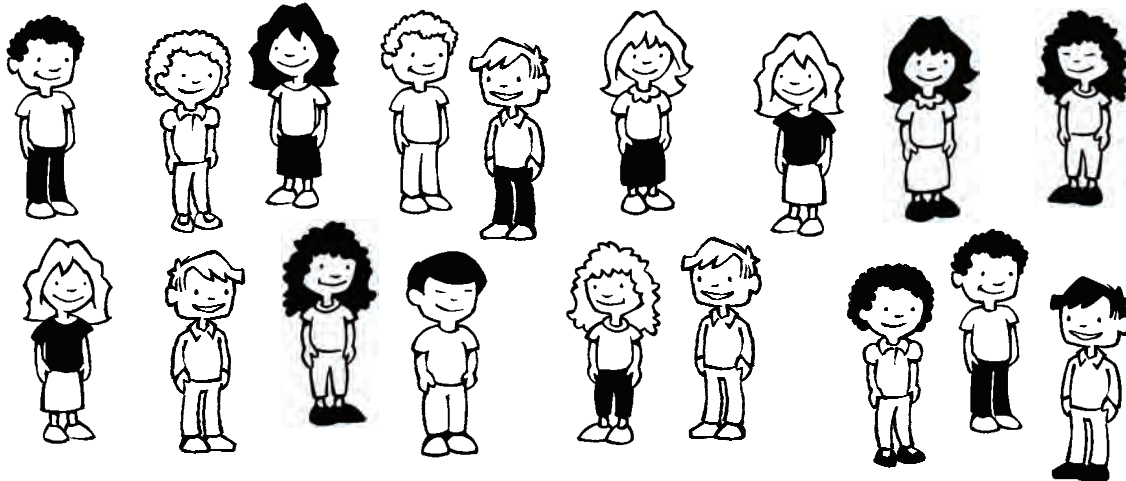
- 3 Tex went to Amusement City.



He had to wait in line for every ride. For the first ride, he waited 1 hour 55 minutes. For the second ride, he waited 1 hour 45 minutes. For the third ride, he waited 25 minutes. Which shows how to find the length of time Tex waited in line for the first two rides combined?

- (A) Add 60 minutes and 55 minutes to get 115 minutes.  
Add 25 minutes to 115 minutes.  
Tex waited in line for a total of 140 minutes for the first two rides.
- (B) Add 60 minutes and 55 minutes to get 115 minutes.  
Add 60 minutes and 45 minutes to get 105 minutes.  
Add the 115 minutes to the 105 minutes to get 220 minutes.  
Tex waited in line for a total of 220 minutes for the first two rides.
- (C) Add 60 minutes and 55 minutes to get 115 minutes.  
Add 60 minutes and 45 minutes to get 105 minutes.  
Subtract 105 minutes from 115 minutes to get 10 minutes.  
Tex waited in line for a total of 10 minutes for the first two rides.
- (D) Add 60 minutes and 55 minutes to get 115 minutes.  
Add 60 minutes and 45 minutes to get 105 minutes.  
Add 115 minutes and 105 minutes and 25 minutes to get 245 minutes.  
Tex waited in line for a total of 245 minutes.

- 4 Students are studying butterflies and moths. They know that in the United States and Canada, more than 750 species of butterflies and 11,000 species of moths have been recorded. For a science project, a teacher is going to put her 18 students into 6 groups. Each group will study a different butterfly or moth.



Select **ONE** correct answer to complete the sentence.

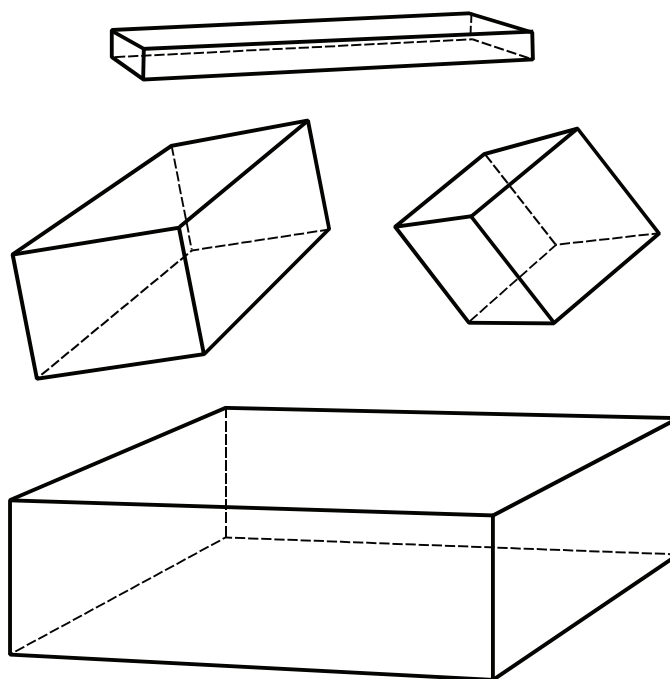
If an equal number of students is placed in each group, and if all students

are assigned to a group, 

(A)	2
(B)	3
(C)	6
(D)	9

 students will be in each group.

5 Look at the four boxes.



All the boxes are rectangular prisms. Which of the following statements are true of rectangular prisms?

Select **THREE** correct answers.

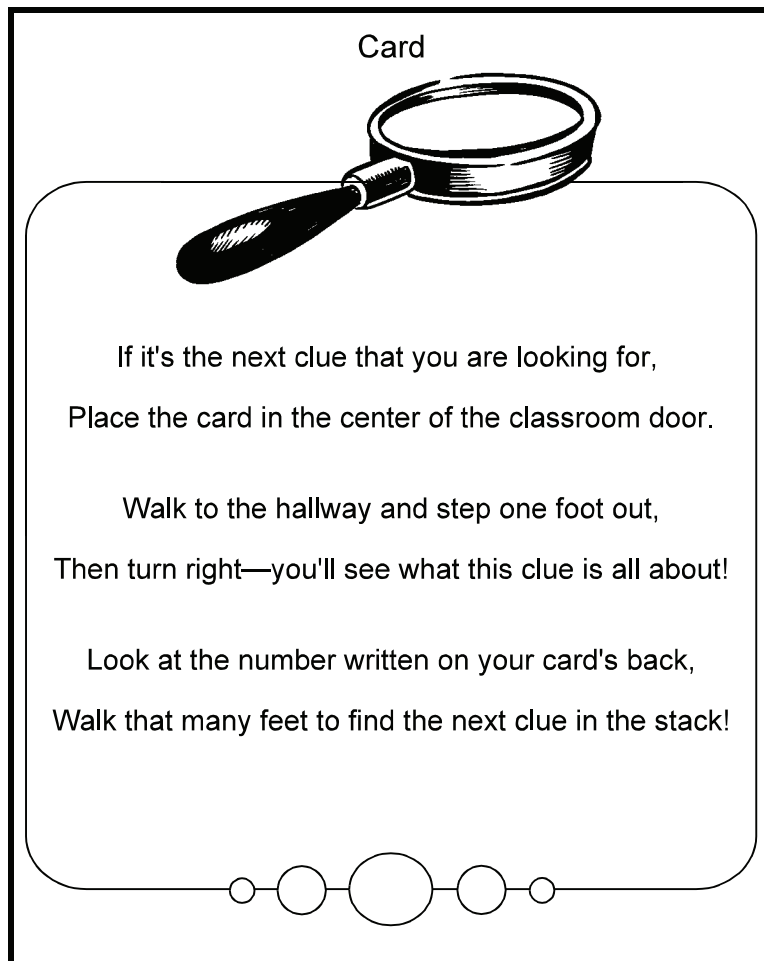
- Rectangular prisms have 6 faces.
- Rectangular prisms have 2 bases.
- Rectangular prisms have 14 edges.
- Rectangular prisms have 8 vertices.
- Rectangular prisms have 8 faces.

Draw a rectangular prism in the space provided.





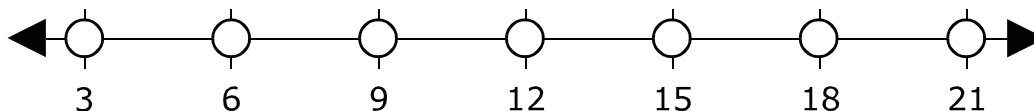
- 6 Sebastian is playing a game. During the game, he is to measure the perimeter of this card in inches. Then he is to write the answer on the back of the card. After that, he is to follow the directions on the card.



If Sebastian is correct, how many feet will he walk down the hallway?

Write your answer in the space provided.

Shade the circle that represents the number of feet Sebastian walked down the hallway.



- 7 Betsy helps stray animals. She saves her money and donates to an animal shelter. The picture shows how much she has saved since she last donated.



What amount has Betsy saved since she last donated?

- (A) \$2.56
- (B) \$2.87
- (C) \$2.60
- (D) \$3.05

**Bonus:** Mark out 2  and 1 . Now how much does Betsy have?

Record your answer in the space provided.

- 8** Makayla wants a new scooter. It costs \$50. She has \$30 saved. Her dad says he will loan her the \$20.00 she still needs, but when she pays it back, she will need to pay interest. For every month Makayla has not paid back the \$20, she will owe her dad \$1 more. If Makayla waits for 3 months to pay her loan, she will owe her dad —

- (A) \$23
  - (B) \$20
  - (C) \$33
  - (D) \$17
- 

- 9** Sissy is so excited! Her grandparents are arriving at the airport soon. If the plane is on time, she will see them in 14 days, 6 hours, and 28 minutes. How many weeks will pass before Sissy sees her grandparents?

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

			.
0	0	0	
1	1	1	
2	2	2	
3	3	3	
4	4	4	
5	5	5	
6	6	6	
7	7	7	
8	8	8	
9	9	9	

- 10** Sid is going to enter her Hero's Engine project in a science fair. Her project will demonstrate Newton's Third Law, "for every action there is an equal and opposite reaction." For her project Sid needs the following:

1 plastic cup  
12 inches of string  
2 plastic bendable straws  
1 inch modeling clay  
1 cup of water  
Sink

Sid will follow the procedure below.

- 1) Poke 2 holes near the top rim, each on opposite sides of the cup.
- 2) Thread the string through the holes and tie a knot at the end of the string so that the cup can be held in the air by the string.
- 3) Make 2 holes near the bottom of the cup just large enough for the straws to fit through.
- 4) Cut each straw about an inch below its bendable part.
- 5) Slide the straws through the holes and point each in a clockwise direction.
- 6) Use the modeling clay to seal the space on the outside of the cup between the cup and the straw.
- 7) Hold the cup over the sink. Pour the water into the cup.

Sid expects the following results.

Gravity will draw the water down and through each straw. This will cause the cup, or engine, to turn in a clockwise motion.

Sid is asked to show each of the third-grade classes how to make a Hero's Engine. There are 3 third-grade classes. Sid uses a new set of materials for each demonstration. How many cups, how many straws, and how many feet of string does she need for the three demonstrations?

Write your answers in the boxes.

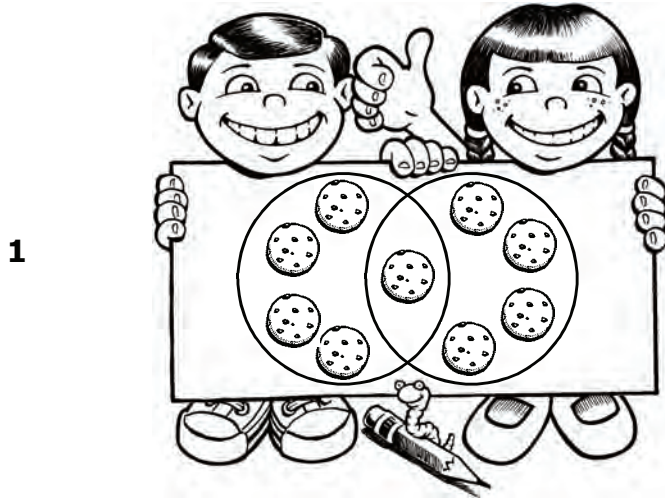
cups    straws    feet of string

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



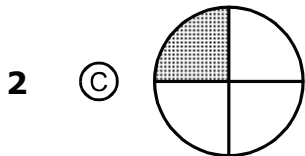
**STAAR CONNECTION™**  
**Diagnostic Series™**  
**Grade 3 Math**  
**Answer Key**

**Assessment 1**



Each student gets  $\frac{1}{2}$  of the cookies.

(D)  $4\frac{1}{2}$



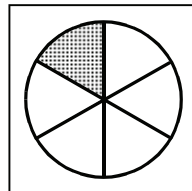
The circle is divided into 4 equal parts, and 1 of those parts is shaded.

**Bonus:**

Write the number of equal parts. 6

Write the number of parts that must be shaded. 1

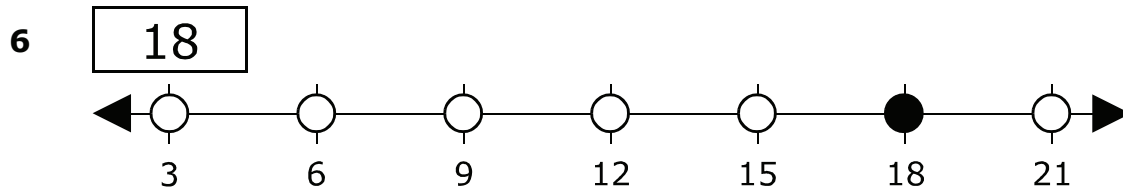
Draw your model. (Answers will vary.)



Explain why your model is correct. (Answers will vary.) My answer is correct because  $\frac{1}{6}$  means one out of six equal parts. I divided my model into 6 equal parts and shaded 1 part.

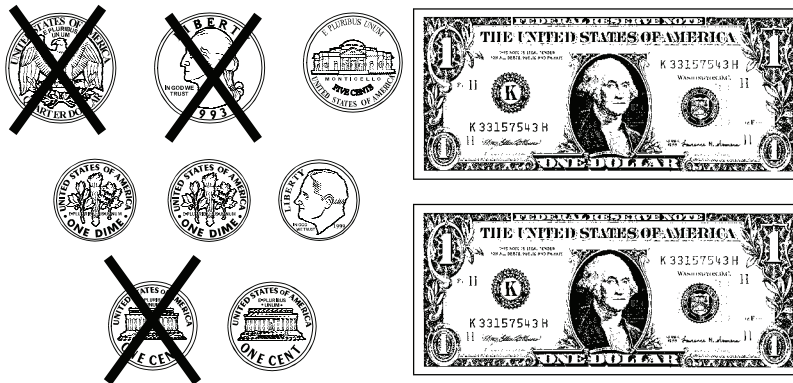
- 3 (B) Add 60 minutes and 55 minutes to get 115 minutes.  
Add 60 minutes and 45 minutes to get 105 minutes.  
Add the 115 minutes to the 105 minutes to get 220 minutes.  
Tex waited in line for a total of 220 minutes for the first two rides.
- 4 (B) 3 students
- 5 (✓) Rectangular prisms have 6 faces.  
(✓) Rectangular prisms have 2 bases.  
(✓) Rectangular prisms have 8 vertices.

**Bonus:** (Answers will vary. Shape must have 6 rectangular faces.)



- 7 (B) \$2.87

**Bonus:**



\$2.36

- 8 (A) \$23

		2	.
0	0	0	
1	1	1	
2	2	●	
3	3	3	
4	4	4	
5	5	5	
6	6	6	
7	7	7	
8	8	8	
9	9	9	

- 9

- 10 3 cups 6 straws 3 feet of string

Student  
Name:

STAAR CONNECTION™  
Grade 3  
Diagnostic Series Math

The following charts provide each item 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	3.3E	3.1A
2	1	Supporting	3.3C	3.1G
3	2	Readiness	3.4A	3.1G
4	2	Supporting	3.4H	3.1A
5	3	Readiness	3.6A	3.1D
6	3	Readiness	3.7B	3.1C
7	4	Supporting	3.4C	3.1A
8	4	Supporting	3.9D	3.1B
9	2	Readiness	3.4K	3.1A
10	2	Supporting	3.4G	3.1A