

# STAAR CONNECTION™

## Diagnostic Series™

Math  
**7**  
teacher  
v2



**KAMICO®**  
Instructional Media, Inc.

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Math  
**7**  
teacher

## Diagnostic Series™

XXVIII/i/MMXXII  
Version 2



**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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**STAAR CONNECTION™**  
**Diagnostic Series™**  
**Grade 7 Math**  
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## Reporting Categories and Related TEKS Grade 7 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.**

- (7.1) **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.**

- (7.2) **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) extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of rational numbers. **Supporting Standard**
- (7.6) **Proportionality.** The student applies mathematical process standards to use probability and statistics to describe or solve problems involving proportional relationships. The student is expected to
- (A) represent sample spaces for simple and compound events using lists and tree diagrams; **Supporting Standard**
  - (C) make predictions and determine solutions using experimental data for simple and compound events; **Supporting Standard**
  - (D) make predictions and determine solutions using theoretical probability for simple and compound events; **Supporting Standard**
  - (E) find the probabilities of a simple event and its complement and describe the relationship between the two; **Supporting Standard**
  - (H) solve problems using qualitative and quantitative predictions and comparisons from simple experiments; and **Readiness Standard**
  - (I) determine experimental and theoretical probabilities related to simple and compound events using data and sample spaces. **Readiness Standard**



## Reporting Category 2: Computations and Algebraic Relationships

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

- (7.3) **Number and operations.** The student applies mathematical process standards to add, subtract, multiply, and divide while solving problems and justifying solutions. The student is expected to
- (A) add, subtract, multiply, and divide rational numbers fluently; and **Supporting Standard**
  - (B) apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers. **Readiness Standard**
- (7.4) **Proportionality.** The student applies mathematical process standards to represent and solve problems involving proportional relationships. The student is expected to
- (A) represent constant rates of change in mathematical and real-world problems given pictorial, tabular, verbal, numeric, graphical, and algebraic representations, including  $d = rt$ ; **Readiness Standard**
  - (B) calculate unit rates from rates in mathematical and real-world problems; **Supporting Standard**
  - (C) determine the constant of proportionality ( $k = y/x$ ) within mathematical and real-world problems; and **Supporting Standard**
  - (D) solve problems involving ratios, rates, and percents, including multi-step problems involving percent increase and percent decrease, and financial literacy problems. **Readiness Standard**
- (7.7) **Expressions, equations, and relationships.** The student applies mathematical process standards to represent linear relationships using multiple representations. The student is expected to
- (A) represent linear relationships using verbal descriptions, tables, graphs, and equations that simplify to the form  $y = mx + b$ . **Readiness Standard**

- (7.10) **Expressions, equations, and relationships.** The student applies mathematical process standards to use one-variable equations and inequalities to represent situations. The student is expected to
- (A) write one-variable, two-step equations and inequalities to represent constraints or conditions within problems; **Supporting Standard**
  - (B) represent solutions for one-variable, two-step equations and inequalities on number lines; and **Supporting Standard**
  - (C) write a corresponding real-world problem given a one-variable, two-step equation or inequality. **Supporting Standard**
- (7.11) **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; and **Readiness Standard**
  - (B) determine if the given value(s) make(s) one-variable, two-step equations and inequalities true. **Supporting Standard**



## Reporting Category 3: Geometry and Measurement

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

- (7.4) **Proportionality.** The student applies mathematical process standards to represent and solve problems involving proportional relationships. The student is expected to
- (E) convert between measurement systems, including the use of proportions and the use of unit rates. **Supporting Standard**
- (7.5) **Proportionality.** The student applies mathematical process standards to use geometry to describe or solve problems involving proportional relationships. The student is expected to
- (A) generalize the critical attributes of similarity, including ratios within and between similar shapes; **Supporting Standard**
  - (B) describe  $\pi$  as the ratio of the circumference of a circle to its diameter; and **Supporting Standard**
  - (C) solve mathematical and real-world problems involving similar shape and scale drawings. **Readiness Standard**
- (7.9) **Expressions, equations, and relationships.** The student applies mathematical process standards to solve geometric problems. The student is expected to
- (A) solve problems involving the volume of rectangular prisms, triangular prisms, rectangular pyramids, and triangular pyramids; **Readiness Standard**
  - (B) determine the circumference and area of circles; **Readiness Standard**
  - (C) determine the area of composite figures containing combinations of rectangles, squares, parallelograms, trapezoids, triangles, semicircles, and quarter circles; and **Readiness Standard**
  - (D) solve problems involving the lateral and total surface area of a rectangular prism, rectangular pyramid, triangular prism, and triangular pyramid by determining the area of the shape's net. **Supporting Standard**
- (7.11) **Expressions, equations, and relationships.** The student applies mathematical process standards to solve one-variable equations and inequalities. The student is expected to
- (C) write and solve equations using geometry concepts, including the sum of the angles in a triangle, and angle relationships. **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.**

- (7.6) **Proportionality.** The student applies mathematical process standards to use probability and statistics to describe or solve problems involving proportional relationships. The student is expected to
- (G) solve problems using data represented in bar graphs, dot plots, and circle graphs, including part-to-whole and part-to-part comparisons and equivalents. **Readiness Standard**
- (7.12) **Measurement and data.** The student applies mathematical process standards to use statistical representations to analyze data. The student is expected to
- (A) compare two groups of numeric data using comparative dot plots or box plots by comparing their shapes, centers, and spreads; **Readiness Standard**
  - (B) use data from a random sample to make inferences about a population; and **Supporting Standard**
  - (C) compare two populations based on data in random samples from these populations, including informal comparative inferences about differences between the two populations. **Supporting Standard**
- (7.13) **Personal financial literacy.** The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one's life as a knowledgeable consumer and investor. The student is expected to
- (A) calculate the sales tax for a given purchase and calculate income tax for earned wages; **Supporting Standard**
  - (B) identify the components of a personal budget, including income; planned savings for college, retirement, and emergencies; taxes; and fixed and variable expenses, and calculate what percentage each category comprises of the total budget; **Supporting Standard**
  - (C) create and organize a financial assets and liabilities record and construct a net worth statement; **Supporting Standard**

- (D) use a family budget estimator to determine the minimum household budget and average hourly wage needed for a family to meet its basic needs in the student's city or another large city nearby;  
***Supporting Standard***
- (E) calculate and compare simple interest and compound interest earnings; and ***Supporting Standard***
- (F) analyze and compare monetary incentives, including sales, rebates, and coupons. ***Supporting Standard***

Name \_\_\_\_\_ Date \_\_\_\_\_

- 1** In his math class, Boris is studying categories of numbers. As part of his homework assignment, he is considering the following set of numbers:  $-101.1$ ,  $-2\frac{1}{4}$ ,  $-10$ ,  $-0.6$ ,  $0$ ,  $3\frac{1}{2}$ ,  $6$  and  $4.21\bar{6}$ . Boris needs to complete the table below by classifying each of these numbers into all the categories to which each belongs. He is to place a tally mark in the column if the number is an example of the group. More than one tally can be made for any of the numbers.

Number Group	Frequency
Natural Number	
Whole Number	
Integer	
Rational Number	

Which of the following tables correctly classifies the set of numbers?

**A**

Number Group	Frequency
Natural Number	//
Whole Number	//
Integer	<del>////</del>
Rational Number	<del>////</del> ///

**C**

Number Group	Frequency
Natural Number	/
Whole Number	//
Integer	///
Rational Number	<del>////</del> ///

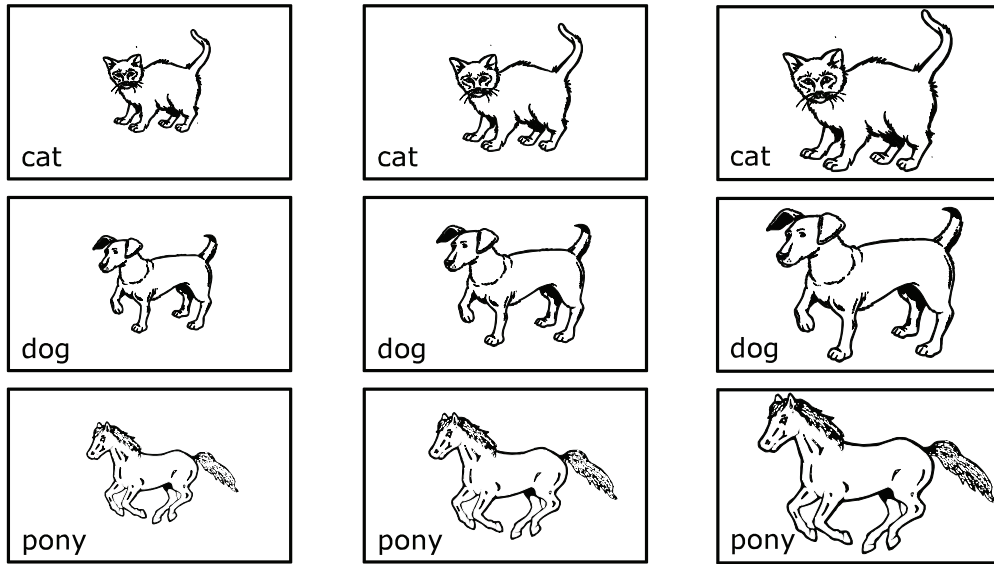
**B**

Number Group	Frequency
Natural Number	/
Whole Number	//
Integer	/
Rational Number	<del>////</del>

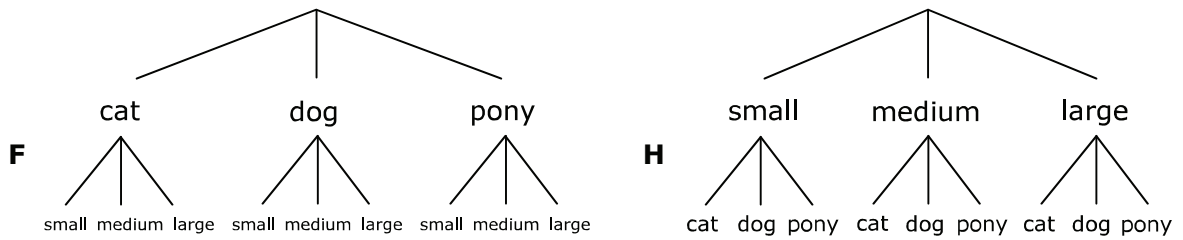
**D**

Number Group	Frequency
Natural Number	//
Whole Number	/
Integer	///
Rational Number	<del>////</del> ///

- 2 Tobenna has 9 equal-sized cards. Pictures on 3 of the cards are small in size. Pictures on 3 of the cards are medium in size. Pictures on 3 of the cards are large in size.



Tobenna selects a card at random. Which answer choice does **not** show all possible outcomes for Tobenna's card selection?



- G**
- | <u>animal on card</u> | <u>size of picture</u> |
|-----------------------|------------------------|
| cat                   | small                  |
| cat                   | medium                 |
| cat                   | large                  |
| dog                   | small                  |
| dog                   | medium                 |
| dog                   | large                  |
| pony                  | small                  |
| pony                  | medium                 |
| pony                  | large                  |

**J**

small	cat	cat	cat
medium	dog	dog	dog
large	pony	pony	pony

- 3** Mr. Lyons schedules a scavenger hunt for a fun cooperative learning activity in his middle-school math class. He places several math problems around the room and instructs his students to find the problems with answers equal to  $-7$ ,  $-1$  or  $7$ . Four of the problems are given below. Which of these expressions does **not** simplify to one of the values Mr. Lyons' students are looking for?

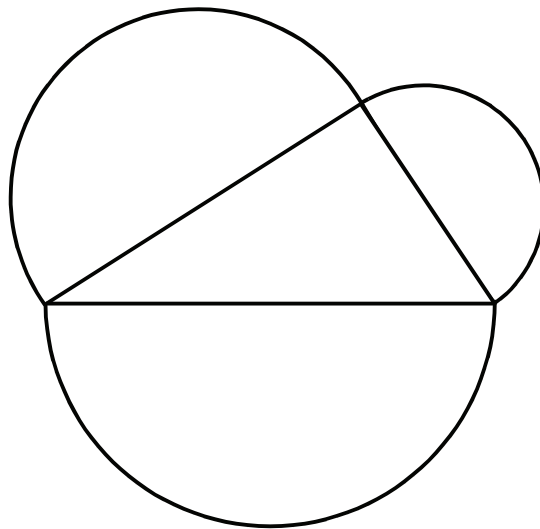
**A**  $-\frac{7}{8} \div -\frac{1}{8}$

**B**  $2 - (-9)$

**C**  $-10 \times 0.10$

**D**  $-4 + (-3)$

- 4** Study the figure.



The perimeter of the semicircular arcs is dependent on the perimeter of the triangle. If the triangle's dimensions change, so does the perimeter of the semicircular arcs. What is the constant rate of change in the perimeter of the semicircular arcs, relative to the change in the perimeter of the triangle?

**F**  $2$

**G**  $\frac{1}{2}$

**H**  $\frac{\pi}{2}$

**J**  $p$

- 5** Due to his father's diplomatic duties, Elwood moved back and forth between the United States and Germany from the time he was 3 years old until he was 8 years old. Heights recorded in Elwood's medical records are therefore in both standard and metric units, depending on where he lived at the time of his doctor visits.

**Heights Recorded at Doctor Visits**

<b>Age</b>	<b>Height</b>
3	32 inches
4	86 centimeters
5	0.90 meter
6	1 yard
7	99 centimeters
8	1 meter 2 centimeters

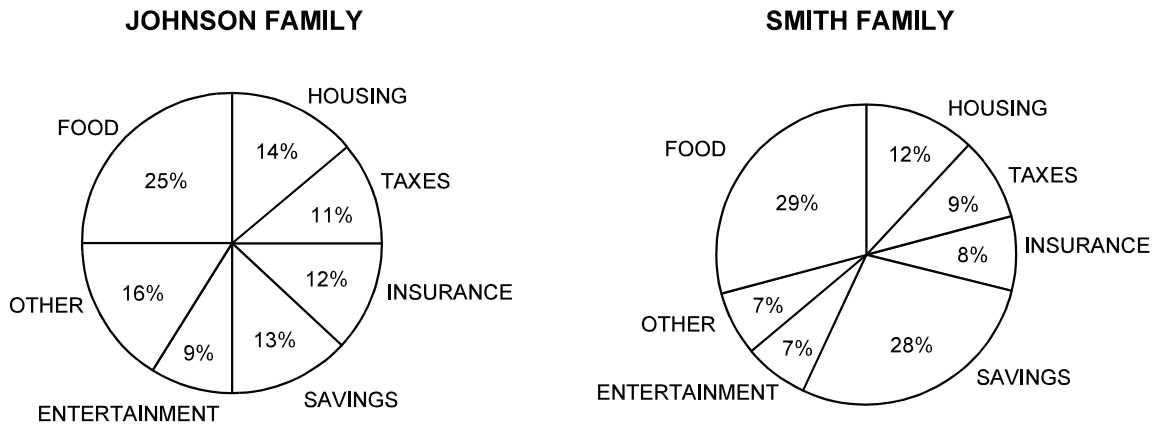
Inches can be converted to centimeters by multiplying the number of inches by 2.54. Use this and other conversion facts to calculate Elwood's growth between doctor visits. How old was Elwood when his doctor's office recorded the greatest increase in his height over that of the last visit?

- A** 4 years
- B** 6 years
- C** 7 years
- D** Not here
- 6** Marlene has a photo that measures 5 inches by 8 inches. The photo cannot be cropped to a standard 5 inches by 7 inches. Marlene takes her photo to a custom photo developer and requests that it be enlarged to 4 times its original area. If the developer increases the size as requested, what would be the perimeter of the enlarged photograph?

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



- 7 A financial advisor sits down with the Johnson family to help them plan a monthly budget. The Johnsons have a household income of \$5,000 per month. To help the family understand how they spend their money, the financial advisor puts their expense information into a circle graph. The financial advisor has done the same for the Smith family, who has a monthly income of \$3,000. The 2 circle graphs are shown.



Determine how much each family spent on entertainment and food combined. Which family spent more? How much more did that family spend on entertainment and food combined than did the family that spent less?

- A Johnson family; \$620
- B Johnson family; \$780
- C Smith family; \$2,780
- D Smith family; \$780

- 8** In Texas, sales taxes are levied by state, county, and local governments. When a customer buys goods and/or services from a business, sales tax is added to the cost of the purchase. The business submits collected taxes to the Texas Comptroller of Public Accounts. The money raised from sales tax is used by government agencies to provide services to the state's citizens. The state of Texas charges 6.25% sales tax. City, county and other government entities (like transit authorities and library districts) can add to the 6.25% base, increasing sales taxes by a maximum of 2%. Therefore, the current maximum sales tax rate in Texas is 8.25% on most goods and services. The following table lists sales tax rates for several cities in Texas.

City	County	State Sales Tax Rate	County Sales Tax Rate	City Sales Tax Rate	Other Municipal Sales Tax Rate	Total Sales Tax Rate
Austin	Travis	6.25%		1%	1%	8.25%
Hall	San Saba	6.25%	$\frac{1}{2}$ %			6.75%
Katy	Harris	6.25%		1%	1%	8.25%
Lytle	Bexar	6.25%	$\frac{1}{2}$ %	$1\frac{1}{2}$ %		8.25%
Rumley	Lampasas	6.25%	$\frac{1}{2}$ %			6.75%
Salado	Bell	6.25%	$\frac{1}{2}$ %	1%	$\frac{1}{2}$ %	8.25%
Weir	Williamson	6.25%		1%		7.25%

Use data from the table to determine sales tax charged on a \$173.28 purchase in Rumley, Texas. Also determine sales tax charged on a \$173.28 purchase in Katy, Texas.

**F** Rumley: \$1,169.65    Katy: \$1,429.56

**G** Rumley: \$13.43    Katy: \$11.70

**H** Rumley: \$11.70    Katy: \$14.30

**J** Rumley: \$10.83    Katy: \$10.83

**Bonus:** Caley is going to purchase an outdoor heater for her patio. In Hall and in Weir, the cost of the heater is \$255. How much less tax will Caley pay if she purchases the heater in Hall than if she purchases the heater in Weir?

- 9 The Tour de France is the world's most prestigious bicycle race. It is held once a year. In 2013, over a period of 23 days, riders competed in 21 stages, or events, covering a total distance of 3,404 kilometers, or 2,115.148 miles. The first 10 stages of the race are listed in the table. Complete the table.

Stage	Distance in Kilometers	Distance in Miles	Miles (rounded to the nearest mile)
1 Porto Verchio to Bastia	213	132.35	
2 Bastia to Ajaccio	156	96.93	
3 Ajaccio to Calvi	145.5	90.41	
4 Nice TTE	25	15.53	
5 Cagnes-Sur-Mer to Marseille	228.5	141.98	
6 Aix-en-Provence to Montpellier	176.5	109.67	
7 Montpellier to Albi	205.5	127.69	
8 Castres to AX3 Domanies	195	121.17	
9 Saint Girons to Bagneres-De-Bigorre	168.5	104.7	
10 Saint-Gildas-Des-Bois to Saint Malo	197	122.41	

Of these 10 stages, about how far, in yards, do riders travel during the 4 shortest stages combined?

- A** 19,360 yd
- B** 66,880 yd
- C** 536,800 yd
- D** 542,080 yd
- 10** A fully mature African Bush elephant weighs about 6 tons. A fully mature African Forest elephant weighs about 3 tons. Jenny goes on an African safari. While on the safari she sees 7 African Bush elephants and 4 African Forest elephants. All 11 of the elephants are fully mature. What is the approximate combined weight, in pounds, of these 11 elephants?
- F** 90,000 lb
- G** 99,000 lb
- H** 108,000 lb
- J** 120,000 lb

Student  
Name:

STAAR CONNECTION™  
Grade 7  
Diagnostic Series Math

The following charts provide the correct answer to each assessment question, 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.

<b>Assessment 1</b>					
<b>Item Number</b>	<b>Correct Answer</b>	<b>Reporting Category</b>	<b>Readiness or Supporting</b>	<b>Content Student Expectation (TEKS)</b>	<b>Process Student Expectation (TEKS)</b>
1	C	1	Supporting	7.2A	7.1D
2	J	1	Supporting	7.6A	7.1E
3	B	2	Supporting	7.3A	7.1B
4	H	2	Readiness	7.4A	7.1B
5	C	3	Supporting	7.4E	7.1A
6	52	3	Supporting	7.5A	7.1A
7	A	4	Readiness	7.6G	7.1G
8	H	4	Supporting	7.13A	7.1A
9	D	2	Readiness	7.3B	7.1B
10	H	2	Readiness	7.3B	7.1A