

# **WASL—Washington Assessment of Student Learning**

A Component of the Washington State Assessment Program

## **Using Results to Improve Student Learning**

**Mathematics**  
**Grade 10**  
2002 Released Items





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August 1, 2002

Dear Washington State Educators:

I am delighted to offer this second annual released test item publication from the 2002 Washington Assessment of Student Learning (WASL). My staff worked hard to be able to release this material in time for your use in administration workshops and LID day trainings for all staff. This publication is designed to assist teachers and administrators in the analysis of the results of specific test items in order to identify patterns, trends, weaknesses, and strengths of student performance on the Essential Academic Learning Requirements (EALRs).

In conjunction with the released test items, the writing prompts and annotations from the Spring 2002 WASL will be available electronically on the OSPI website, as will released science pilot items for grades 5, 8, and 10.

As a teacher, or as a district or building administrator, you will be able to analyze the actual test items and the data that accompany them to learn more about students in your school and district. You will be able to compare the performance of your school to your district or the state. By analyzing the differences in the data and the relationship that each question has with the EALRs, you will be able to identify areas where performance is strong and areas for improvement in your school and district. I fervently hope opportunities will be provided prior to the start of the school year for principals and teachers to work with the item-specific scoring guides in listening, reading, mathematics, and science and the annotated student responses that illustrate each score point. This experience will help schools work more effectively with students and parents this fall and throughout the school year.

OSPI hopes that you will use the information to begin a thoughtful, impassioned dialogue about what we expect our students to know and be able to do and how well they need to do it. We expect that this material will initiate conversations among administrators, faculty, students, and parents as to how this information can impact our teaching, our learning, and our communication. Plans to improve student learning should not be made based on these results alone. It is important to also include the results from other assessments used by the teacher, school, and/or district.

In November, OSPI assessment staff will again conduct regional training on the effective use of these materials.

Congratulations on our efforts to improve student learning in Washington. Have a great fall as we continue our work toward creating thoughtful, competent citizens in the 21st century. I encourage you to search our website for further resources ([www.k12.wa.us](http://www.k12.wa.us)).

Sincerely,

A handwritten signature in black ink that reads "Terry Bergeson". The signature is written in a cursive style with a large, prominent "T" and "B".

Dr. Terry Bergeson  
State Superintendent of Public Instruction

## How to Use this Released Item Booklet and the Item Analysis Report

### Introduction:

You should have two documents: one, this Released Item Booklet and two, the Item Analysis Report. These two documents should be used together to help administrators and teachers understand released WASL items that reflect content-specific learning strands and targets which are derived from the Essential Academic Learning Requirements.

This **Released Item Booklet** includes the following information:

- WASL items from the 2002 Operational Test
- A table for each item where you can transfer the school-level, district-level, and state-level data information
- Information to indicate the learning target and strand information for each item
- Item-specific scoring guides, student work at representative score points, and annotated explanations for scores.

The **Item Analysis Report** includes the following information:

- A list of all released items referenced to learning strands and learning targets
- Multiple-choice items include the percentage of students who responded to each possible answer. Correct answers have asterisks. Information is presented by the percentage of students responding to each possible answer by school, by district, and by state.
- For constructed-response items, including short answers and extended response, information is presented by the percentage of students who scored at each score point by school, by district, and by state.

### How to Understand Your Data:

- First, transfer your data from the Item Analysis Report to the Released Item Booklet. Transfer all the information for each item into each table. By transferring the data, you will have all the information in one place.
- Second, examine the item types that represent the school's or the district's strengths or weaknesses. Does the school or district perform well on multiple-choice items? Constructed-response items? What percentage of students in a school or a district left constructed-response items blank or earned a zero?
- Third, examine the learning strands and targets represented by each item. Group together targets that represent strengths or weaknesses for a school or a district. Do the targets all fit underneath one particular strand or do they belong to several strands?
- Fourth, look for trends. Does a school perform markedly lower on a particular item in comparison to the district or the state? Does a school or a district perform markedly higher on a particular item in comparison to the state?

## Introduction to Released Mathematics Items

Welcome to the Released Item Booklet for the WASL 2002 mathematics items. In this booklet you will find 11 items that were part of the spring 2002 WASL test for mathematics.

There are four types of test items:

- multiple-choice items where students earn one point by selecting the right answer from a few options
- extended multiple-choice items where students can earn up to two points by first selecting the right answer from options and then explaining something about their choice
- short-answer items where students earn up to two points by writing an answer, explaining their thinking, drawing a picture or diagram, or showing steps used to solve a problem
- extended-response items where students can earn up to four points by constructing a response that asks for more details (graphs, tables, written summaries) or more thinking.

Please note that in releasing 11 items from the 2002 WASL test for mathematics, OSPI is releasing approximately 36% of the mathematics WASL. The items that were not released this year will be used on future WASLs. However, these released items also provide invaluable opportunities for teachers and administrators to become familiar with the types of mathematics items derived from the mathematics EALRs while also becoming experienced with the item-specific scoring guides and annotated samples of student responses.

You may want to become familiar with the WASL test and item specifications (located on our website—[www.k12.wa.us](http://www.k12.wa.us)) as you study the items, your school or district's data, and the annotated student responses contained in this Released Item Booklet. Each item in this booklet represents a “learning target,” which is a mathematics skill derived from the EALRs that can be captured in a paper and pencil assessment. These targets are subsets of the nine content and process mathematics strands.

As you begin to analyze your data, think about what would account for the performance of students on particular items. Although many of the items can represent strength and weaknesses across schools, districts, and the state, attempt to maintain the whole picture in your analysis. Staff at OSPI recommends that you examine the items themselves closely and ask yourselves, “What do we expect our students to know and be able to do in order to be successful on this item?” Along with classroom performance information, results from other tests, and these test items, informed curriculum decisions can be made.

In order to assist you in your efforts in understanding and using the Released Item Test Booklet, please do not hesitate to search our website for further resources or call our offices in Olympia for further information.

1 Audrey is given the following problem to solve.

$$\begin{array}{r} a\ b a \\ +\ a\ b \\ \hline a\ 7\ 7 \end{array}$$

Audrey has to solve for  $a$  and  $b$ . Which of the following is **not** possible?

- A.  $b$  is odd and greater than  $a$ .
- B.  $a$  is even and smaller than 5.
- C.  $a$  and  $b$  are both odd numbers.
- D.  $a$  and  $b$  are both prime numbers.

Item Information:

Correct Answer: C

Strand: Number Sense

Learning Target: NS02: Demonstrate an understanding of the properties of rational numbers, powers, and roots; demonstrate an understanding of concepts and processes involving prime and composite numbers, factors and multiples, and divisibility (Mathematics EALR 1.1.1, 1.1.3)

Performance Data (Use this space to fill in student performance information for your school, district, and the state.):

<b>Percent Distribution</b>			
School	District	State	Responses (* = correct response)
			A
			B
			C*
			D
			NR

## Mathematics

2 Which term is a factor of  $3a^2 + 12a$ ?

- A.  $3a$
- B.  $4a$
- C.  $3a^2$
- D.  $4a^2$

Item Information:

Correct Answer: A

Strand: Number Sense

Learning Target: NS02: Demonstrate an understanding of the properties of rational numbers, powers, and roots; demonstrate an understanding of concepts and processes involving prime and composite numbers, factors and multiples, and divisibility (Mathematics EALR 1.1.1, 1.1.3)

Performance Data (Use this space to fill in student performance information for your school, district, and the state.):

Percent Distribution			
School	District	State	Responses (* = correct response)
			A*
			B
			C
			D
			NR

**3** Grand Coulee Dam is made of about 10,585,000 cubic yards of concrete. Which of the following would give the total amount of concrete in cubic feet?

- A.**  $10,585,000 \times 27$
- B.**  $10,585,000 \div 27$
- C.**  $10,585,000 \times 9$
- D.**  $10,585,000 \div 9$

Item Information:

Correct Answer: A

Strand: Measurement

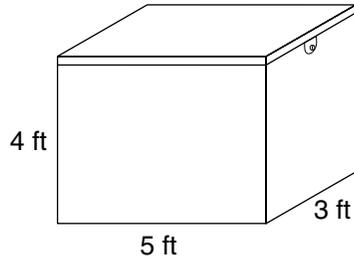
Learning Target: ME02: Measure objects and events directly and use indirect methods; calculate rate and other derived and indirect measurements (Mathematics EALR 1.2.2, 1.2.3)

Performance Data (Use this space to fill in student performance information for your school, district, and the state.):

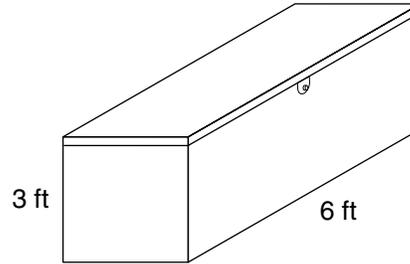
<b>Percent Distribution</b>			
School	District	State	Responses (* = correct response)
			A*
			B
			C
			D
			NR

## Mathematics

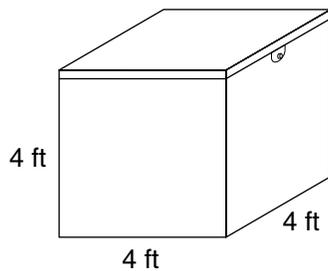
4 Terry is designing a flyer to advertise storage boxes that he sells.



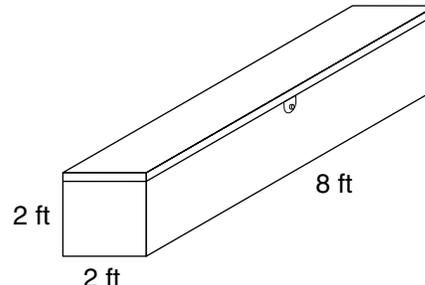
**Box A**



**Box C**



**Box B**



**Box D**

He wants to show the boxes from **least to greatest** volume. What is the correct order?

- A. BACD
- B. ABCD
- C. DCBA
- D. DCAB

**4** (continued)

Item Information:

Correct Answer: D

Strand: Measurement

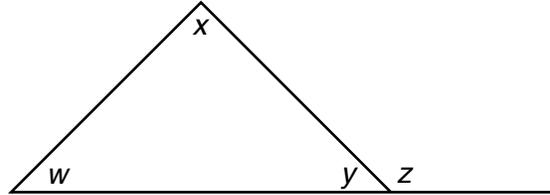
Learning Target: ME02: Measure objects and events directly and use indirect methods; calculate rate and other derived and indirect measurements (Mathematics EALR 1.2.2, 1.2.3)

Performance Data (Use this space to fill in student performance information for your school, district, and the state.):

<b>Percent Distribution</b>			
School	District	State	Responses (* = correct response)
			A
			B
			C
			D*
			NR

## Mathematics

- 5 Each letter in the diagram below represents an angle.



Which of the following statements is true?

- A.  $x + z = y + z$
- B.  $w + x > y + z$
- C.  $w + x + y = y + z$
- D.  $w + x + y < y + z$

Item Information:

Correct Answer: C

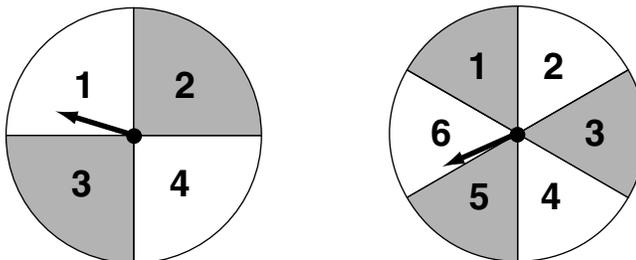
Strand: Geometric Sense

Learning Target: GS01: Use geometric properties and relationships to describe, compare, contrast, and classify 2- and 3-dimensional geometric figures; draw geometric models and scale drawings using tools as appropriate (Mathematics EALR 1.3.1, 1.3.2)

Performance Data (Use this space to fill in student performance information for your school, district, and the state.):

Percent Distribution			
School	District	State	Responses (* = correct response)
			A
			B
			C*
			D
			NR

- 6 In a certain carnival game, a player gets to spin each of the following spinners once. What is the probability of getting two numbers that have a sum of 7?



- A.  $\frac{1}{4}$   
 B.  $\frac{1}{6}$   
 C.  $\frac{5}{12}$   
 D.  $\frac{7}{24}$

# Mathematics

6 (continued)

Item Information:

Correct Answer: B

Strand: Probability and Statistics

Learning Target: PS01: Demonstrate an understanding of the properties of dependent and independent events; demonstrate an understanding of and use appropriate counting procedures to determine probabilities; use both experimental and theoretical methods to determine probabilities (Mathematics EALR 1.4.1, 1.4.2, 1.4.3)

Performance Data (Use this space to fill in student performance information for your school, district, and the state.):

Percent Distribution			
School	District	State	Responses (* = correct response)
			A
			B*
			C
			D
			NR

- 7** Kesha is planning to rent a van for her trip to Mt. Rainier. Two of her friends each rented the same type of van from the same car rental company last week. This is what they told her:

John: "The cost of my rental was \$240. The company charged me a certain amount per day and a certain amount per mile. I had the rental for five days and I drove it 200 miles."

Katie: "The cost of my rental was only \$100. I drove it for 100 miles and had it for two days."

Kesha plans to get the same type of van that John and Katie had from the same car rental company. Kesha estimated her trip would be 250 miles, and she would have the vehicle for four days. Which of the following equations could Kesha use to figure out how much her rental would cost?

**Let  $C$  = cost,  $M$  = miles, and  $D$  = days**

- A.**  $C = 40.00M + 0.20D$
- B.**  $C = 40.00D + 0.20M$
- C.**  $C = 20.00M + 0.40D$
- D.**  $C = 20.00D + 0.40M$

# Mathematics

7 (continued)

Item Information:

Correct Answer: B

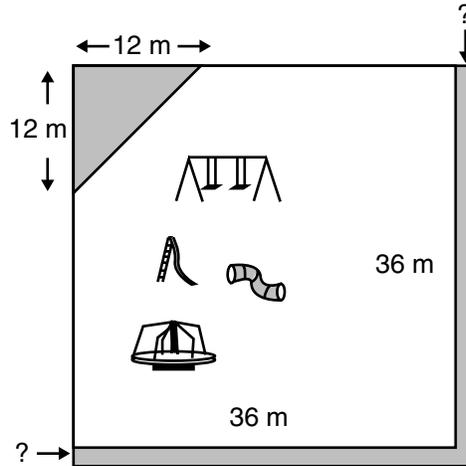
Strand: Algebraic Sense

Learning Target: AS03: Simplify and evaluate expressions and formulas; solve equations and inequalities (Mathematics EALR 1.5.5, 1.5.6)

Performance Data (Use this space to fill in student performance information for your school, district, and the state.):

<b>Percent Distribution</b>			
School	District	State	Responses (* = correct response)
			A
			B*
			C
			D
			NR

- 8** The school playground, a 36 m square, is going to lose part of one corner due to construction. The city will take a triangular section that measures 12 m and 12 m on the perpendicular sides.



The city has agreed to allow the school to expand the playground on the remaining two sides to replace the lost area. Find the approximate width of the strip that will be added to each of the two sides.

Clearly show your work.

<p><b>Approximate width of the strip is _____</b></p>

# Mathematics

8 (continued)

Item Information:

Score points: 2

Strand: Measurement

Learning Target: ME03: Demonstrate an understanding of how precision and accuracy of measurement are affected by calculating procedures; know when to estimate and use estimation to obtain reasonable approximations (Mathematics EALR 1.2.4, 1.2.5)

Performance Data (Use this space to fill in student performance information for your school, district, and the state.):

Percent Distribution			
School	District	State	Points
			0
			1
			2
			NR
			Mean

*Scoring Guide for question number 8:*

A **2-point** response: The student demonstrates an understanding of measurement by showing how to compute the area of a triangle (72 square meters) and find the width (approximately 1 meter) of two rectangles that are 36 meters long and have an area approximately equal to the area of the triangle.

A **1-point** response: The student does one of the following:

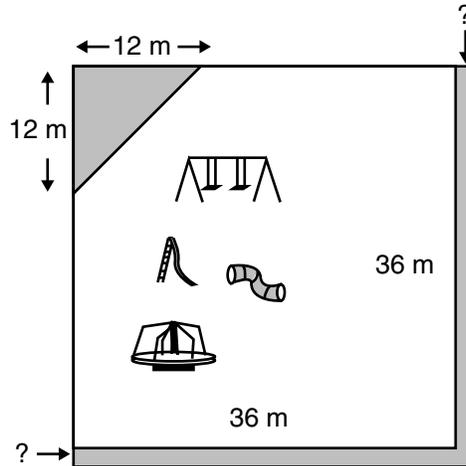
- Shows the computation of the area of the triangle (72 square meters)
- Finds the approximate dimension of the width of the rectangle, which is 1 meter
- Uses the area of a square rather than a triangle and arrives at an incorrect width of 2 meters.

A **0-point** response: The student shows no understanding of how to compute the area of a triangle or how to find the width of the rectangular piece of land with a given length and area.

## Mathematics

### Annotated Example of a 2-point response for question number 8:

- 8 The school playground, a 36 m square, is going to lose part of one corner due to construction. The city will take a triangular section that measures 12 m and 12 m on the perpendicular sides.



The city has agreed to allow the school to expand the playground on the remaining two sides to replace the lost area. Find the approximate width of the strip that will be added to each of the two sides.

Clearly show your work.

$$12 \times 12 = 144 \div 2 = 72$$

$$32 \times 2 = 72$$

$$w \text{ of strip} \approx 1m$$

The area they're losing is  $72m^2$ .

The approximate length of the strip is 72m, therefore the width only needs to be 1m.

**Annotated Example of a 2-point response for question number 8 (continued):**

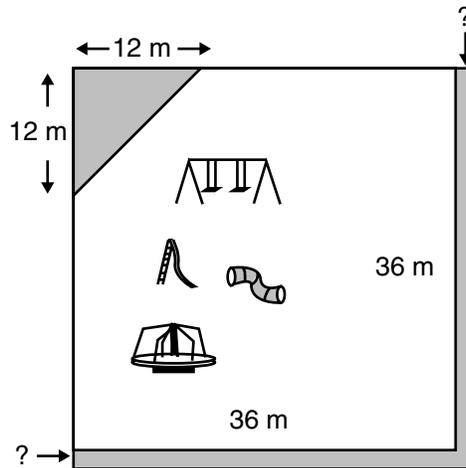
Annotations:

This response demonstrates an understanding of measurement by showing correct computations for the area of the triangle and relating the area of the triangle to the area and dimensions of the strip to be added to each side. The response indicates “*approximate length of the strip is 72m,*” which leads to a correct width of “*1m.*” This response earns two points.

## Mathematics

### Annotated Example of a 1-point response for question number 8:

- 8 The school playground, a 36 m square, is going to lose part of one corner due to construction. The city will take a triangular section that measures 12 m and 12 m on the perpendicular sides.



The city has agreed to allow the school to expand the playground on the remaining two sides to replace the lost area. Find the approximate width of the strip that will be added to each of the two sides.

Clearly show your work.

$$12 \cdot 12 = 144 \div 2 = 72$$
$$A = 72$$
$$72 = 36W = 2$$
$$72 = 34W =$$

First, to find the area of the triangle, I took  $\frac{1}{2}bh$  and got 72. I then plugged this along with 36 into  $A=LW$  and solved for  $w$ . I got 2m'

**Annotated Example of a 1-point response for question number 8 (continued):**

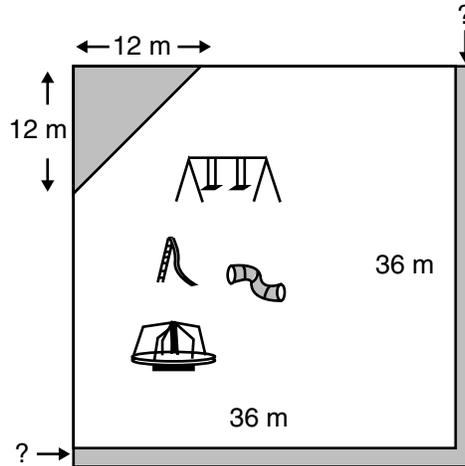
Annotations:

This response demonstrates a partial understanding of measurement by correctly calculating the area of the triangle, " $12 \cdot 12 = 144 \div 2 = 72$ ". However, it considers only one strip with a length of 36 and incorrectly concludes that the width of the rectangular piece of land is "2m." This response earns one point.

## Mathematics

### Annotated Example of a 0-point response for question number 8:

- 8 The school playground, a 36 m square, is going to lose part of one corner due to construction. The city will take a triangular section that measures 12 m and 12 m on the perpendicular sides.



The city has agreed to allow the school to expand the playground on the remaining two sides to replace the lost area. Find the approximate width of the strip that will be added to each of the two sides.

Clearly show your work.

36 by 36 taking off 12 by 12 will
leave them with 24 by 24 you can
add 6 by 6 to make it 30 by 30
Approximate width of the strip is <u>6m</u>

**Annotated Example of a 0-point response for question number 8 (continued):**

Annotations:

This response shows little or no understanding of measurement. There is no computation for finding the area of the triangle or the width of the strip and it states an incorrect width of “6m.” This response earns zero points.

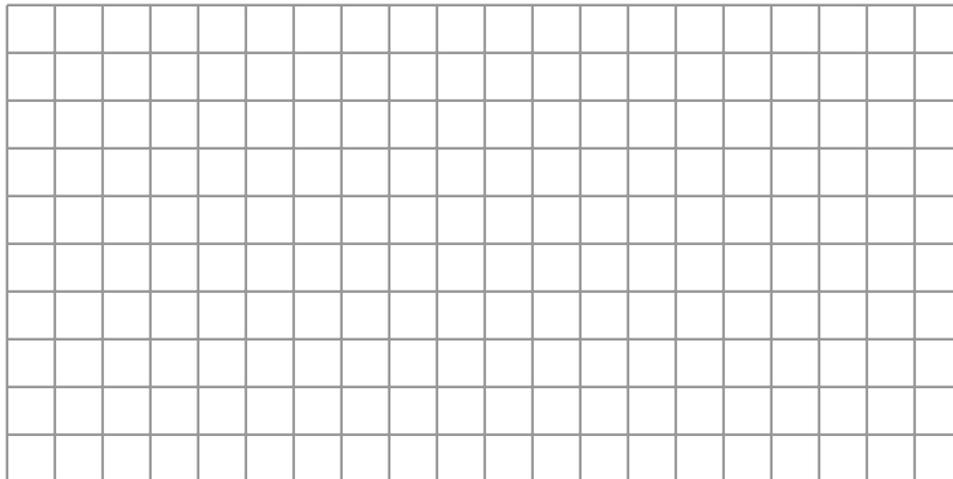
## Mathematics

- 9 Mrs. Andrews is supervising an independent study course. Each of the students is required to complete 20 assignments. The list below shows how many assignments each student has completed.

Student	Number of Assignments Completed
Mike Cooper	10
Manuel Flores	15
Latasha Williams	11
Sondra Rao	10
Tam Chan	14

Use the grid to create a bar graph that shows the **percentage** of assignments completed by each student. Clearly label the scale and axes.

**Percentage of Assignments Completed**



**9** (continued)

Item Information:

Score points: 2

Strand: Probability and Statistics

Learning Target: PS03: Organize and display data in appropriate forms; calculate and use different measures of central tendency, variability, and range as appropriate to describe a set of data; use statistics to support different points of view (Mathematics EALR 1.4.5, 1.4.6, 1.4.7)

Performance Data (Use this space to fill in student performance information for your school, district, and the state.):

<b>Percent Distribution</b>			
School	District	State	Points
			0
			1
			2
			NR
			Mean

## Mathematics

*Scoring Guide for question number 9:*

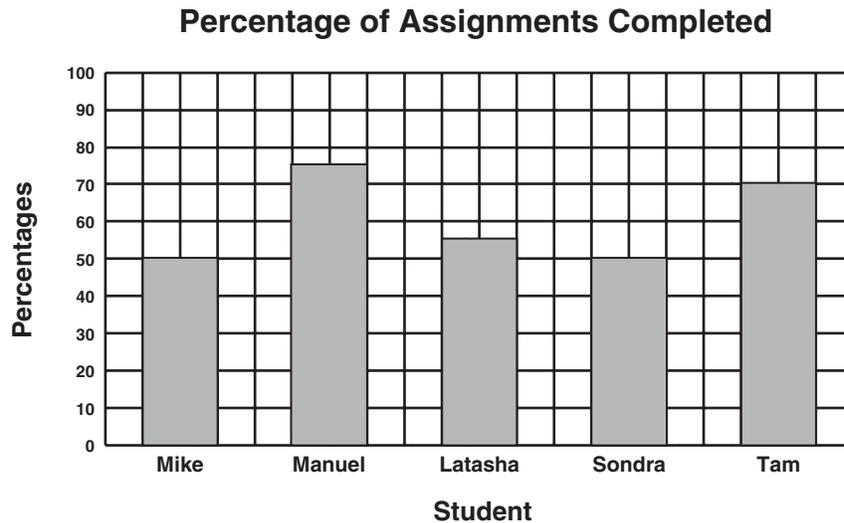
A **2-point** response: The student displays data appropriately by constructing a bar graph with:

- A consistent scale
- Correctly labeled axes
- Bars showing correct percentages of assignments completed by each student.

NOTE: Allow for one error such as missing one label, one bar missing or graphed incorrectly, shift of origin (graph does not start at 0), inconsistent scale, inappropriate scale, or one (1) incorrect percent.

NOTE: The % sign with each number can be considered an axis label.

Example:



A **1-point** response: The student demonstrates some understanding of how to display data appropriately by constructing a bar graph that does one of the following:

- Contains two or three errors (See NOTE above)
- Uses 15 total assignments to calculate percents or uses the number of assignments rather than converting to percents.

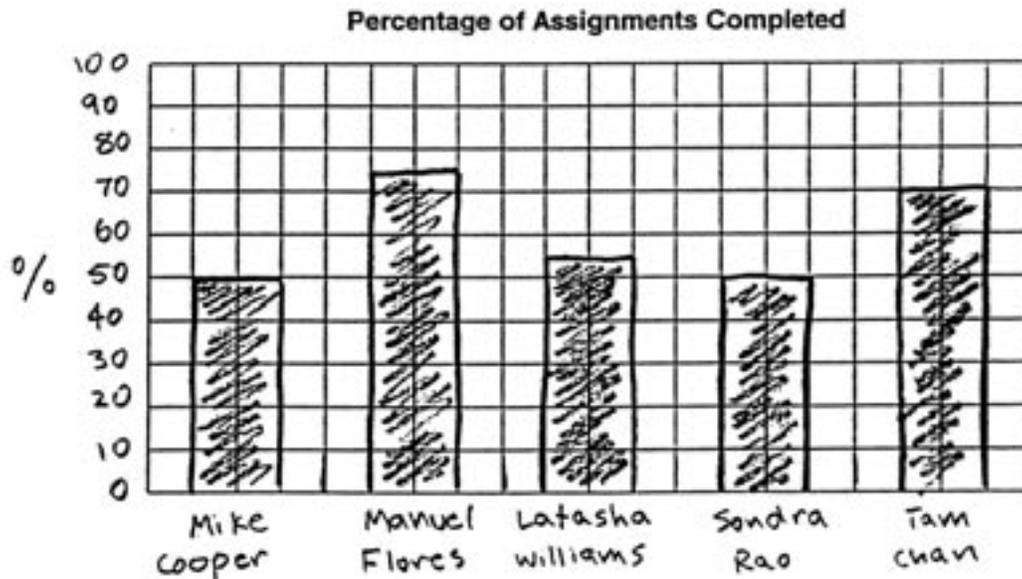
A **0-point** response: The student shows little or no understanding of how to display data in a bar graph. The response may contain more than three errors, show a graph without a scale, or shows a line graph.

**Annotated Example of a 2-point response for question 9:**

- 9 Mrs. Andrews is supervising an independent study course. Each of the students is required to complete 20 assignments. The list below shows how many assignments each student has completed.

Student	Number of Assignments Completed
Mike Cooper	10
Manuel Flores	15
Latasha Williams	11
Sondra Rao	10
Tam Chan	14

Use the grid to create a bar graph that shows the **percentage** of assignments completed by each student. Clearly label the scale and axes.



Annotations:

This response displays data appropriately in the form of a bar graph. The scale is consistent. The vertical axis is correctly labeled. All of the percentages are graphed appropriately. There is only one error which is the missing label for the horizontal axis. This response earns two points.

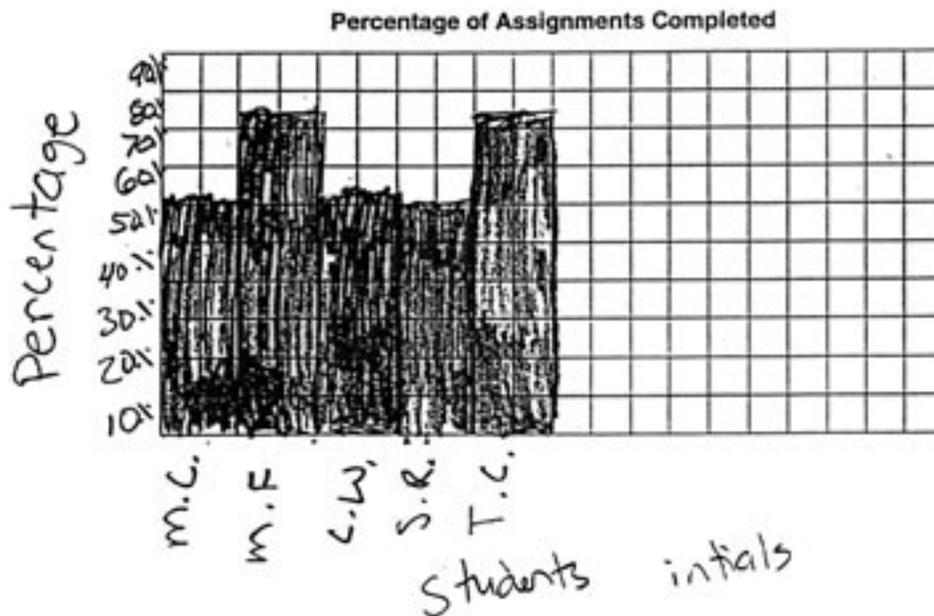
## Mathematics

### Annotated Example of a 1-point response for question 9:

- 9 Mrs. Andrews is supervising an independent study course. Each of the students is required to complete 20 assignments. The list below shows how many assignments each student has completed.

Student	Number of Assignments Completed
Mike Cooper	10
Manuel Flores	15
Latasha Williams	11
Sondra Rao	10
Tam Chan	14

Use the grid to create a bar graph that shows the **percentage** of assignments completed by each student. Clearly label the scale and axes.



Annotations:

This response displays data in the form of a partially correct bar graph with two errors. The scale is not consistent—the labels for the vertical axis are placed on and between the lines leading to an error for all data 50% and higher. The axes are correctly labeled. The percentages are correct, except for T.C., which is incorrectly graphed as 75% rather than 70%. This response earns one point.

**Annotated Example of a 0-point response for question 9:**

- 9 Mrs. Andrews is supervising an independent study course. Each of the students is required to complete 20 assignments. The list below shows how many assignments each student has completed.

Student	Number of Assignments Completed
Mike Cooper	10
Manuel Flores	15
Latasha Williams	11
Sondra Rao	10
Tam Chan	14

Use the grid to create a bar graph that shows the **percentage** of assignments completed by each student. Clearly label the scale and axes.



Annotations:

This response shows little or no understanding of how to display data in the form of a bar graph. The scale is consistent. The horizontal axis is labeled correctly as "STUDENTS." However, because this is a line graph, this response earns zero points.

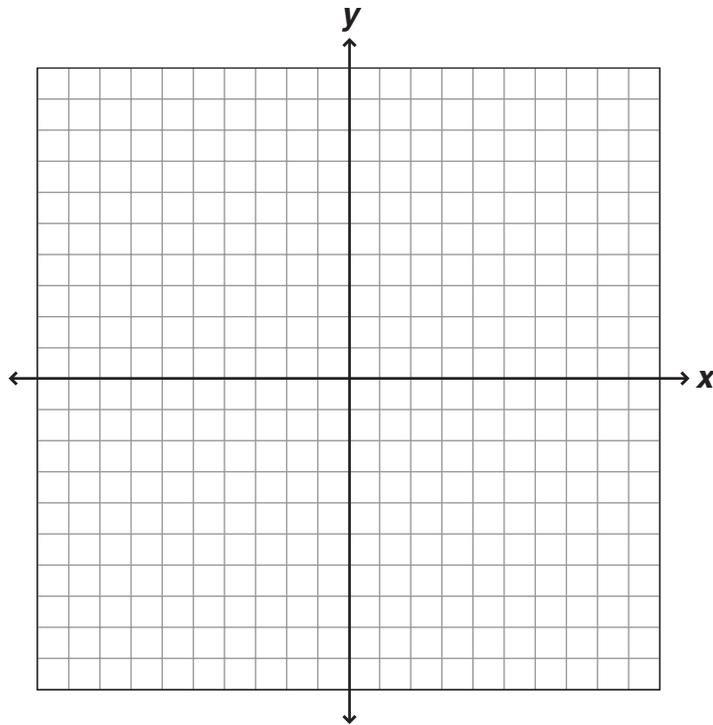
## Mathematics

- 10 The following table shows the relationship between some Fahrenheit temperatures and their Celsius equivalents.

° Fahrenheit	° Celsius
-13	-25
-4	-20
5	-15
23	-5
32	0
50	10
68	20

Use this information to draw a line graph that shows Fahrenheit temperature on one axis and Celsius temperature on the other. Be sure your graph has the following:

- title
- scale labels
- axis labels



**10** (continued)

Item Information:

Score points: 2

Strand: Communicates Understanding

Learning Target: CU02: Clearly organize, represent, and express mathematical information, situations, and ideas in ways appropriate for the given audience and purpose (Mathematics EALR 4.2.1, 4.3.1, 4.3.2)

Performance Data (Use this space to fill in student performance information for your school, district, and the state.):

<b>Percent Distribution</b>			
School	District	State	Points
			0
			1
			2
			NR
			Mean

## Mathematics

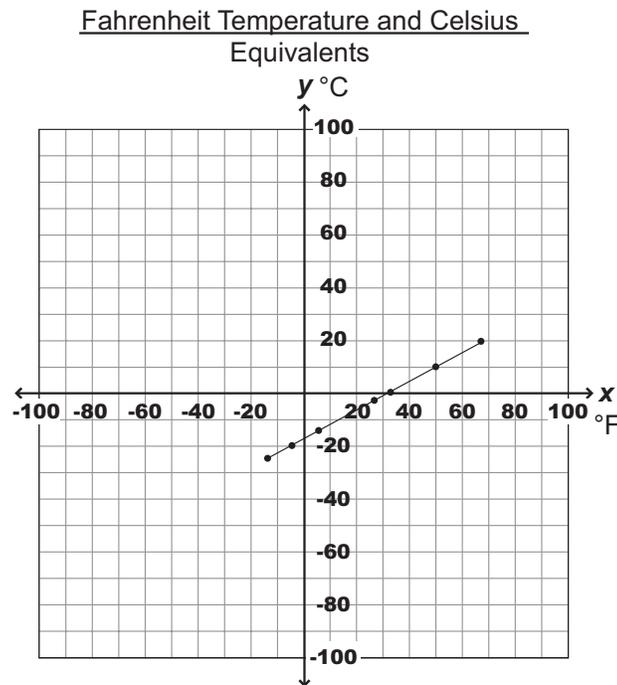
*Scoring Guide for question number 10:*

A **2-point** response: The student clearly represents the given information in a line graph by including the following:

- two consistent and appropriate scales
- labels on both axes
- an informative title
- accurately plotted points.

Allow for one error.

Example:



A **1-point** response: The student draws a partially accurate line graph of the relationship between Celsius and Fahrenheit. The graph has two or three errors, which may include the following: a missing title, a missing label, an inconsistent scale, or an incorrectly plotted point.

NOTE: Two missing labels are considered two errors.

NOTE: Signs switched on axis scale are considered an error (i.e., negative on right side of  $x$ -axis and positive on left side of  $x$ -axis).

A **0-point** response: The student shows little or no mathematical understanding of representing information in a line graph. For example, it has four or more errors or plots the data points as the scale.

**Annotated Example of a 2-point response for question 10:**

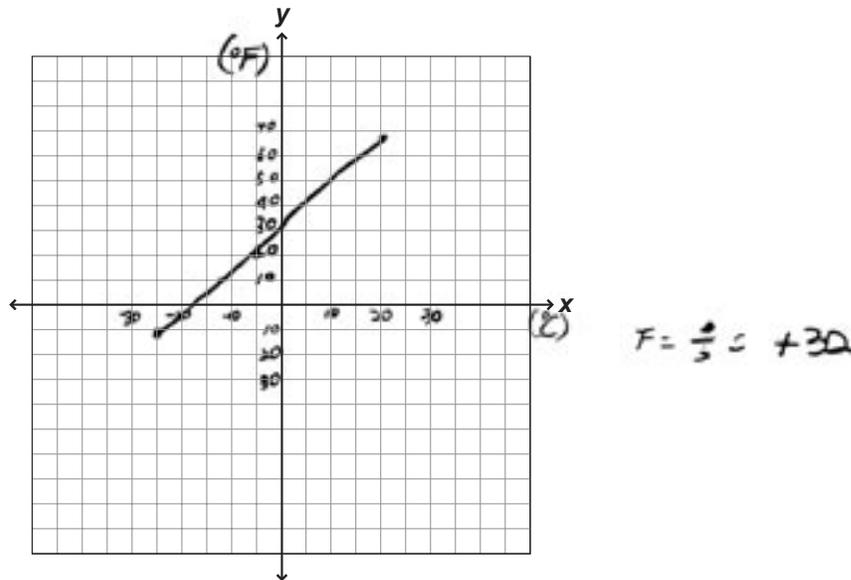
**10** The following table shows the relationship between some Fahrenheit temperatures and their Celsius equivalents.

° Fahrenheit	° Celsius
-13	-25
-4	-20
5	-15
23	-5
32	0
50	10
68	20

Use this information to draw a line graph that shows Fahrenheit temperature on one axis and Celsius temperature on the other. Be sure your graph has the following:

- title
- scale labels
- axis labels

Graph between Fahrenheit and Celsius



Annotations:

This response shows understanding of how to effectively and appropriately organize and represent mathematical information in a line graph. This response includes a correctly plotted line, two consistent scales, an appropriate title, and labels on both axes. This response earns two points.

## Mathematics

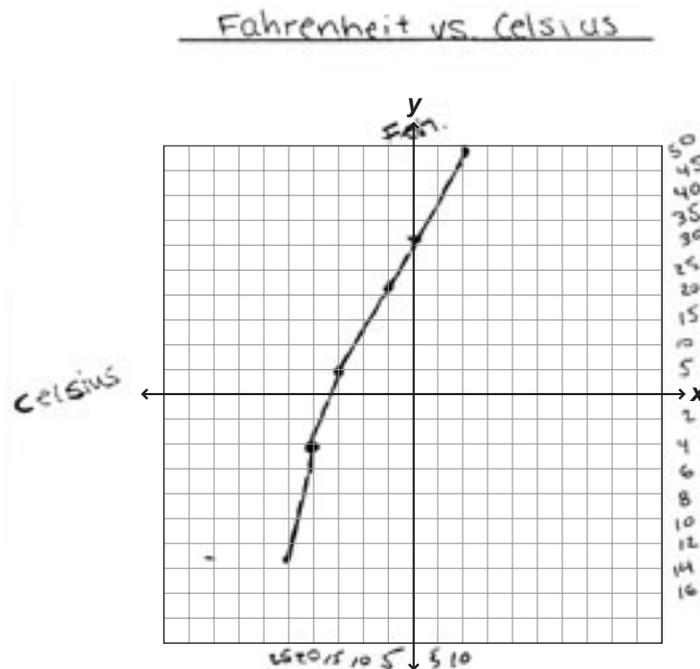
### Annotated Example of a 1-point response for question 10:

- 10** The following table shows the relationship between some Fahrenheit temperatures and their Celsius equivalents.

° Fahrenheit	° Celsius
-13	-25
-4	-20
5	-15
23	-5
32	0
50	10
68	20

Use this information to draw a line graph that shows Fahrenheit temperature on one axis and Celsius temperature on the other. Be sure your graph has the following:

- title
- scale labels
- axis labels



Annotations:

This response shows some understanding of how to organize and represent mathematical information in a line graph. The line graph has an inconsistent scale for the Fahrenheit axis. The point (68, 20) is not plotted due to an inappropriate scale. This response has two errors and earns one point.

**Annotated Example of a 0-point response for question 10:**

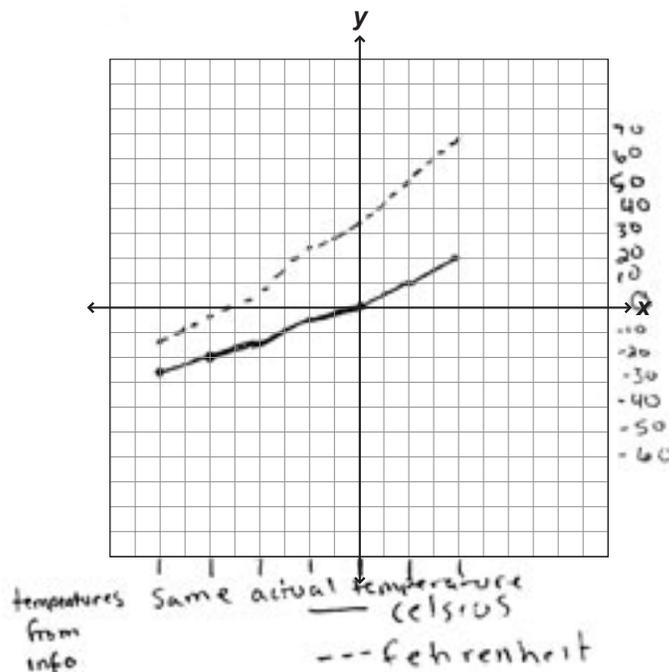
**10** The following table shows the relationship between some Fahrenheit temperatures and their Celsius equivalents.

° Fahrenheit	° Celsius
-13	-25
-4	-20
5	-15
23	-5
32	0
50	10
68	20

Use this information to draw a line graph that shows Fahrenheit temperature on one axis and Celsius temperature on the other. Be sure your graph has the following:

- title
- scale labels
- axis labels

*Fahrenheit & Celsius equivalents*

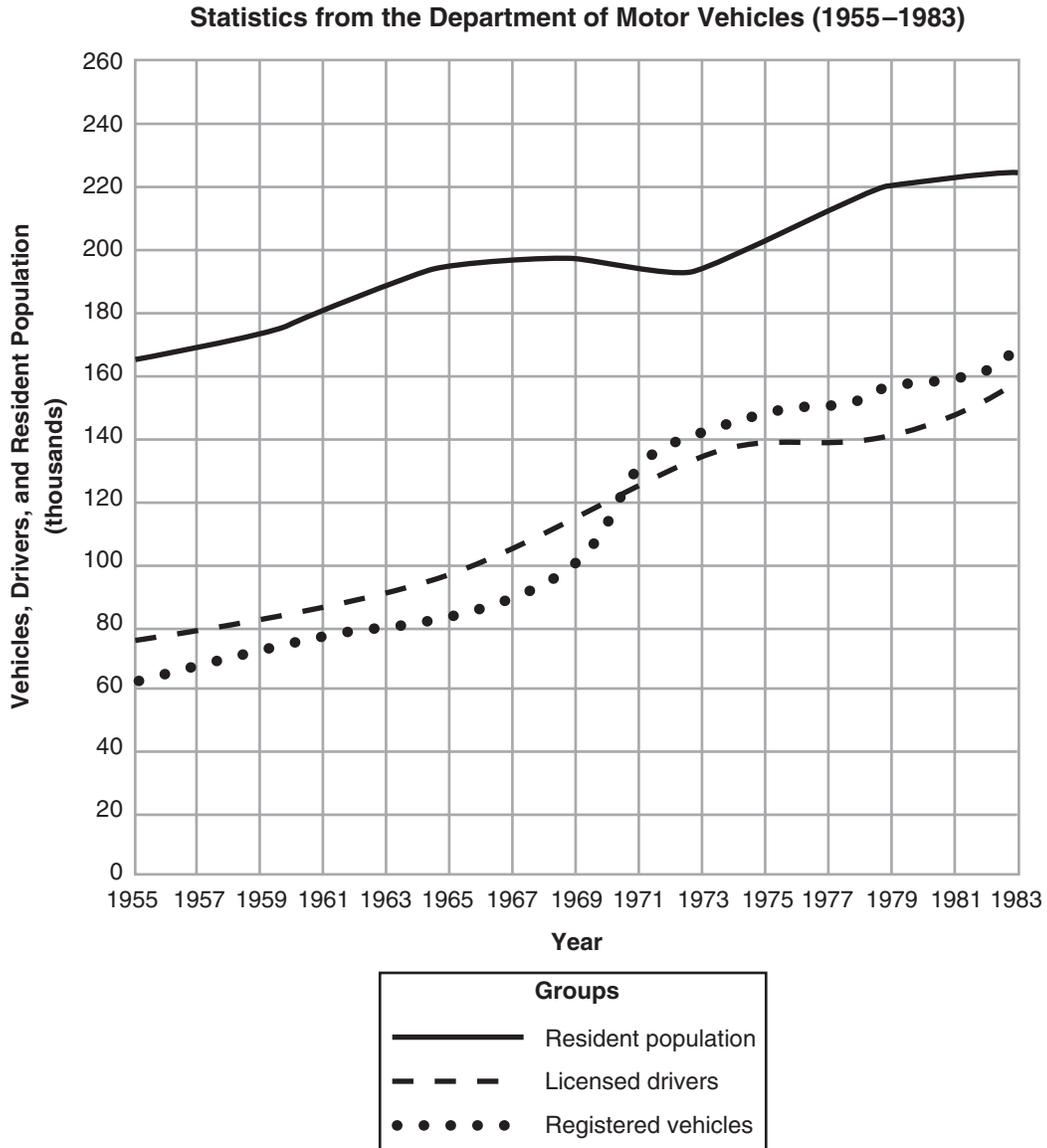


Annotations:

This response shows very little understanding of how to effectively and appropriately represent mathematical information in a line graph. The line graph shows one consistent scale but has no labels on the axes. It shows two lines, one for Celsius and one for Fahrenheit, but it is impossible to tell where points have been plotted. This response earns zero points.

## Mathematics

- 11** The graph below shows information about three groups over a 28-year period—the number of licensed drivers, the number of registered vehicles, and the resident population of a certain area.



**11** (continued)

Below, briefly describe the changes that took place for one group during the entire time period shown.

- Name the group.
- Describe the changes using numbers and years in your description.


Describe one way that any two of the groups changed in relation to one another during a particular period of time.

- Name the two groups.
- Give the time period you are considering.
- Describe how the two groups changed in relation to one another during that particular time period.


# Mathematics

11 (continued)

Item Information:

Score points: 4

Strand: Communicates Understanding

Learning Target: CU01: Develop or select a plan for collecting information;  
extract mathematical information from multiple sources  
(Mathematics EALR 4.1.1, 4.1.2)

Performance Data (Use this space to fill in student performance  
information for your school, district, and the state.):

Percent Distribution			
School	District	State	Points
			0
			1
			2
			3
			4
			NR
			Mean

*Scoring Guide for question number 11:*

A **4-point** response: The student extracts, interprets, and describes information from a graph by doing both of the following:

- Identifies a specific group, provides or implies correct start date and end date, provides an accurate description of the entire time period, and includes at least 2 accurate dates and at least 2 accurate numbers. An accurate description must include the drop in residential population, the leveling of licensed drivers, or the sharp increase in registered vehicles. NOTE: Allow one error in interpreting the numbers in the graph (e.g., disregarding scale of thousands).
- Correctly describes how the numbers of two specified groups compared during a stated or implied time period. (Implied time periods must have a stated beginning or end date).

Example:

Resident population: 165,000 in 1955, increased steadily to 195,000 in 1969, decreased to 190,000 in 1972, increased steadily to 225,000 in 1983.

Licensed drivers: 75,000 in 1955, increased steadily to 140,000 in 1974, leveled off until 1978, and increased steadily to 160,000 in 1983.

Registered vehicles: 60,000 in 1955, increased steadily to 100,000 in 1969, sharply increased to 140,000 in 1972, then steadily increased to 160,000 in 1983.

## Mathematics

A **3-point** response: The student does one of the following:

- Identifies a specific group, provides or implies correct start date and end date, provides an accurate description of the entire time period, and includes at least 2 accurate dates and at least 2 accurate numbers

AND

Describes how the numbers of two specified groups compared during a stated or implied time period, but the description contains an interpretation error or contradiction. An accurate description must include the drop in residential population, the leveling of licensed drivers, or the sharp increase in registered vehicles. NOTE: Allow one error in interpreting the numbers in the graph (e.g., disregarding scale of thousands).

- Describes a correct overall trend for the entire time period and includes dates OR identifies a specific group, provides or implies correct start date and end date, provides a description of the entire time period, includes at least 2 accurate dates and at least 2 accurate numbers, but makes an inaccurate statement

AND

Correctly describes how the numbers of two specified groups compared during a stated or implied time period. (Implied time periods must have a stated beginning or end date).

A **2-point** response: The student does one of the following:

- Identifies a specific group, provides or implies correct start date and end date, provides an accurate description of the entire time period, and includes at least 2 accurate dates and at least 2 accurate numbers. An accurate description must include the drop in residential population, the leveling of licensed drivers, or the sharp increase in registered vehicles. NOTE: Allow one error in interpreting the numbers in the graph (e.g., disregarding scale of thousands).

- Identifies a specific group, provides or implies correct start date and end date, provides a description of the entire time period, includes at least 2 accurate dates and at least 2 accurate numbers, but makes an inaccurate statement OR describes a correct overall trend for the entire time period and includes dates

**2-point** response (continued)

AND

Describes how the numbers of two specified groups compared during a stated or implied time period, but the description contains an interpretation error or contradiction.

- Correctly describes how the numbers of two specified groups compared during a stated or implied time period. (Implied time periods must have a stated beginning or end date).

A **1-point** response: The student does one of the following:

- Describes a correct overall trend for the entire time period and includes dates OR identifies a specific group, provides or implies correct start date and end date, provides a description of the entire time period, includes at least 2 accurate dates and at least 2 accurate numbers, but makes an inaccurate statement.
- Describes how the numbers of two specified groups compared during a stated or implied time period, but description contains an interpretation error or contradiction.

A **0-point** response: The student shows little or no understanding of extracting, interpreting, or describing information from a graph.

## Mathematics

### Annotated Example of a 4-point response for question number 11:

**11** Below, briefly describe the changes that took place for one group during the entire time period shown.

- Name the group.
- Describe the changes using numbers and years in your description.

*The resident population was about 165,000 in 1955.*

*The population began to increase to 195,000 in*

*1969. Then there was a decrease from 1969 to*

*1972 where the population went down to 190,000.*

*In 1973 the population began to rise until 1983*

*where the final population was 225,000.*

Describe one way that any two of the groups changed in relation to one another during a particular period of time.

- Name the two groups.
- Give the time period you are considering.
- Describe how the two groups changed in relation to one another during that particular time period.

*Licensed drivers and registered vehicles had were*

*equal during 1970. Before that time there was less*

*registered vehicles than licensed drivers. After*

*1970 there were more registered vehicles than*

*licensed drivers.*

### **Annotated Example of a 4-point response for question number 11 (continued):**

Annotations:

This response extracts all applicable mathematical information from the graph and interprets what is shown by naming the group “*resident population*” and describes changes using numbers and words such as “*The population began to increase to 195,000 in 1969. Then there was a decrease from 1969 to 1972 where the population went down to 190,000.*” In the second part the response names the two groups, “*licensed drivers*” and “*registered vehicles,*” and gives time periods, such as “*After 1970,*” with a description of how the two groups changed in relation to one another during that time period: “*there were more registered vehicles than licensed drivers.*” This response earns four points.

## Mathematics

### Annotated Example of a 3-point response for question number 11:

**11** Below, briefly describe the changes that took place for one group during the entire time period shown.

- Name the group.
- Describe the changes using numbers and years in your description.

<i>The licensed drivers steadily &amp; slowly climbed</i>
<i>from 78,000 to 140,000 from 1955 to 1975. Then</i>
<i>from 1975 to 1979 it stayed the same. Then from</i>
<i>1979 to 1983 it started climbing again.</i>

Describe one way that any two of the groups changed in relation to one another during a particular period of time.

- Name the two groups.
- Give the time period you are considering.
- Describe how the two groups changed in relation to one another during that particular time period.

<i>The 2 groups are registered vehicles and licensed</i>
<i>drivers. The time period is from 1967 to 1975.</i>
<i>Until about 1970 the number of registered</i>
<i>vehicles was less than licensed drivers. Then in</i>
<i>1971 the licensed drivers became more numerous</i>
<i>than registered vehicles &amp; stayed that way.</i>

### **Annotated Example of a 3-point response for question number 11 (continued):**

Annotations:

This response extracts applicable mathematical information from the graph and interprets what is shown by naming the group “*licensed drivers*” and describes changes for the entire time period “*from 1955 to 1975,*” “*from 1975 to 1979,*” and “*from 1979 to 1983.*” This response also uses numbers “*from 78,000 to 140,000,*” to describe the change from 1955 to 1975. This response names two groups “*registered vehicles and licensed drivers*” but the description contains an inaccurate statement: “*in 1971 the licensed drivers became more numerous than registered vehicles & stayed that way.*” This response earns three points.

## Mathematics

### Annotated Example of a 2-point response for question number 11:

**11** Below, briefly describe the changes that took place for one group during the entire time period shown.

- Name the group.
- Describe the changes using numbers and years in your description.

<i>As the population went up so did the amount of</i>
<i>registered vehicles and licensed drivers but in</i>
<i>about 1970 the number of registered vehicles</i>
<i>started to be more than the number of licensed</i>
<i>drivers.</i>

Describe one way that any two of the groups changed in relation to one another during a particular period of time.

- Name the two groups.
- Give the time period you are considering.
- Describe how the two groups changed in relation to one another during that particular time period.

<i>The amount of registered vehicles become</i>
<i>greater than the number of licensed drivers in</i>
<i>the 1970s</i>

### **Annotated Example of a 2-point response for question number 11 (continued):**

Annotations:

This response extracts some mathematical information from the graph but mainly describes the graph and not the information in it. The first description does not focus on one group, there are no numbers given, and there are no time periods referenced. The second description correctly describes how the numbers of two specified groups compared during a stated time period, “*the 1970’s.*” This response earns two points.

## Mathematics

### Annotated Example of a 1-point response for question number 11:

**11** Below, briefly describe the changes that took place for one group during the entire time period shown.

- Name the group.
- Describe the changes using numbers and years in your description.

<i>Resident Pop.—the population increased for 14</i>
<i>years &amp; then decreased for another 4 yrs. &amp; then</i>
<i>increased for the next 10 yrs. Licensed Drivers—</i>
<i>more &amp; more people became licensed drivers</i>
<i>through the 29 years. Registered vehicles through</i>
<i>the years more people reg. their vehicles.</i>

Describe one way that any two of the groups changed in relation to one another during a particular period of time.

- Name the two groups.
- Give the time period you are considering.
- Describe how the two groups changed in relation to one another during that particular time period.

<i>licensed drivers—there became less drivers</i>
<i>through 1969-1983. Registered vehicles—there</i>
<i>were more vehicles registered than there were</i>
<i>people w/licenses through 1971-1983.</i>

**Annotated Example of a 1-point response for question number 11 (continued):**

Annotations:

This response mentions all three groups in the first description, does not give changes, and does not use numbers. The second description makes a comparison of two specified groups during a stated time period, but the answer also states, “*there became less drivers through 1969–1983.*” This is an interpretation error. This response earns one point.

## Mathematics

### Annotated Example of a 0-point response for question number 11:

- 11** Below, briefly describe the changes that took place for one group during the entire time period shown.
- Name the group.
  - Describe the changes using numbers and years in your description.

<i>Resident pop. = 162-221 in 1955-1983 Licensed</i>
<i>drivers 79-138 in 1955-1983 Registered vehicles</i>
<i>61-67 in 1955-1983</i>

Describe one way that any two of the groups changed in relation to one another during a particular period of time.

- Name the two groups.
- Give the time period you are considering.
- Describe how the two groups changed in relation to one another during that particular time period.


**Annotated Example of a 0-point response for question number 11 (continued):**

Annotations:

This response shows little understanding of how to extract information from a graph. The first description mentions all three groups and does not give a time period or use numbers to describe one of the groups. There is no response on the second description. This response earns zero points.





