Answers and Explanations

Literacy and English Language Arts

1. C: Four years. One hundred percent language development is not achieved until age five.

2. A: Alphabet books, wordless picture books, and easy-to-read books. The other genres are more suitable for older children with well-developed reading skills.

3. A: Analogy. The statement is not a metaphor because it contains the word "like." A metaphor does not. An example of a metaphor would be "He was a frozen statue, motionless beside the door." There is no symbolism in the statement, "He ran as fast as a rabbit," nor is there any repetition.

4. D: Instruct students in sciences, such as mathematics and biology. Textbooks have that goal. Children's literature is designed to enhance moral values, instruct through entertaining stories, and promote a life-long interest in reading.

5. B: The ability to understand the abstract concept expressed in metaphors is not developed until later in childhood. Analogies are easier for children to understand because they compare known items, whereas metaphors require abstract thinking.

6. B: Fantasy. Fantasy stories and books revolve around magical or supernatural creatures. The Harry Potter books are one example of this genre. Science fiction is a similar genre, but relies on the portrayal of a future world, creatures from other planets or galaxies, etc. Action and Adventure involves solving mysteries. Historical fiction stories are set sometime in the past and are usually accurate in their historical information.

7. A: In role playing writing, the child writes in scribbles that are only meaningful to him or her. In early writing, the child begins to use real letters.

8. A: Action and Adventure. One example of this genre is Nancy Drew. Action and Adventure stories do not rely on magical or supernatural events as do Fantasy, Horror, and Ghost stories. They are not biographical unless telling the life of a real person.

9. B: Use in-depth evaluation and early intervention to assist the child with language delays. Research shows that early intervention is highly successful, while a wait-and-see approach just prolongs the delayed language development. Common developmental problems like saying "w" instead of "r" disappear on their own as the child matures and do not need intervention.

10. A: Characters. Children enjoy identifying with a character and experiencing life from that character's point of view. If readers do not bond with a character, they will not enjoy the story.

11. B: Assign the student an appealing task related to the subject area that requires creativity, research, or in-depth study, such as making a collage or creating a play. Assigning the student to tutor classmates does not assist in the intellectual growth of an academically talented student, and the student is apt to resent such an assignment. The teacher needs to be aware that academically

talented students also have special academic needs and continue to challenge them with meaningful assignments.

12. A: Essays. In an essay, the writer defends an opinion, giving reasons for that opinion. Biographies are written to narrate the life of a person. Memoirs detail a person's own life and do not defend opinions. Informational texts are factual.

13. C: Small muscle control. Small muscles are those that enable us to make precise motions, such as gripping a pencil and writing letters with it. Large muscle control involves activities such as running or jumping. The ability to speak is not a developmental skill leading to the ability to write.

14. D: Denouement. The denouement is the end of the story. The other choices are intermediate steps in writing a story.

15. D: Reading instructors should teach students to activate their prior knowledge because it will improve their reading comprehension. Before reading (A), teachers should discuss and model connections with existing knowledge to prepare students by helping them consider what they already know about the subject of the text. While they read (B), students can make better sense of the text by considering how it fits with what they already know. After reading (C), teachers can lead discussions helping students focus on how the connections they made between the text and their previous knowledge informed their understanding of the text, and on how the text helped them build on their foundations of existing knowledge.

16. B: Why the students participate in a reading/learning activity refers to the motivation for the activity. Option A refers to the timing of the reading/learning activity. Option C refers to the place or physical setting of the learning activity. Option D refers to the way(s) in which the learning activity is defined and executed. All of these activity settings are factors that influence learning differently according to the different cultural, social, and economic factors involved in each specific situation.

17. B: Pragmatics is the study of how language is used socially for communication. In reading instruction, pragmatic cues relate to the reader's purposes for reading and the reader's understanding of the workings of textual structures. Although pragmatic cues are valid and important, the Three Cueing Systems model does not include a pragmatic "system." The three cueing systems named in this theory are the phonological system of sound cues (D), the Semantic system of meaning cues (C), and the Syntactic system of sentence-structure cues (A).

18. A: The Latin word *sal* meant "salt." According to the famous ancient historian Pliny the Elder, "in Rome, a soldier was paid in salt," as it was a means of preserving food in the days before refrigeration and was thus a very valuable commodity. The Latin term *salarium*, from the root *sal*, originally meant the salt paid to soldiers but eventually became generalized to mean any kind of payment. (The expression "worth your salt" also derives from this origin.) "Salary" may sound similar to "celery" (B), but their roots and meanings are not the same. While salt eventually referred to any kind of payment including money or other kinds, it never originally meant *money* (C). "Earnings" (D) is a Modern English synonym for "salary" rather than the original meaning of its root word.

19. D: Organizing writing into paragraphs is done either during the writing process or afterwards in the revision stage. It is not a prewriting strategy.

20. B: "First we decide who is going to host the holiday dinner." A clue is found in the word "first." A list of actions or ideas often follows a topic sentence.

21. B: In Old Italian, the word *disastro* meant unfavorable in one's stars. It was commonplace to attribute bad fortune to the influences of the stars in the Medieval and Renaissance eras. The Old Italian word came into English in the late 1500s as "disaster" and was used by Shakespeare (cf. *King Lear*). The word's Latin root is *astrum*, meaning "star," and the Latin prefix *dis-*, meaning "apart" and signifying negation. *Catastrophe* (A) and *misfortune* (C) are both Modern English meanings of the word "disaster," whereas the "ill-starred" meaning used in Elizabethan times has now become archaic or obsolete. The root means "star," not the aster flower (D).

22. C: Students are more involved in their writing if the audience varies. Examples of varied audiences include letters to the editor, letters to a friend, an essay written for a community group, and a story written for younger children or beginning readers.

23. A: How to tell fiction from nonfiction. This is a skill that children learn by following clues within the literature that point out whether the story is true or not. Young children are not yet ready to distinguish bias in an author's writing or understand themes and theories.

24. C: A euphemism is an expression used instead of more literal words to make a harsh expression sound softer, to make an impolite description sound more polite, or to make a description less polite (such as saying "bit the dust" instead of "died" in a formal setting). Jargon (A) is the specialized terminology of a specific field or group. This example, however, is NOT medical jargon; a better example might be "expired" or "deceased." Ambiguity (B) means unclear and/or open to multiple interpretations. A better example of ambiguity in this scenario might be, "The surgery did not obtain all of the desired outcomes." This can mean a greater number of things than that the patient died. A connotation (D) is a suggested meaning associated with the literal meaning of a word. For example, "The surgery was abortive" does not state that the patient died, but if the surgery was meant to save the patient's life, the adjective "abortive," meaning unsuccessful or failing to obtain the desired result, could connote that the patient died.

25. B: Small words in titles like "the" and "of." State names, proper names, and main words in titles should all be capitalized.

26. C: Persuasion. Elena's paragraph was written to persuade. Clues to her purpose can be found in the first and last sentences, which clearly try to influence the reader.

27. B: The word "brunch" is a blend of "breakfast" and "lunch". Blends of two or more words are known as portmanteau words. (*Portmanteau* is a French word meaning a suitcase.) "Fax" (A) is an example of clipping, or shortening a word, from its original "facsimile." "Babysitter" (C) is an example of compounding, or combining two or more words into one. "Saxophone" (D) is an example of proper noun transfer: A Belgian family that built musical instruments had the last name of Sax, and this wind instrument was named after them. These represent some of the ways that new words have entered—and still do enter—the English language.

28. D: Students decide whether another student's essay is good writing or poor writing. Peer editing should consist of suggestions for improvement and never involve judgmental decisions about quality.

29. D: Provide a wide variety of reading materials for children to choose from. Each classroom will have students who are just beginning to read and some that are reading fluently above grade level. Providing reading materials with an appealing variety of subject matter and broad distribution of reading levels will ensure that every child in the class can select an appropriate book to read.

30. C: Have the same vowel sound. Words with assonance have the same vowel sound. An example would be cow and loud.

31. C: This sentence appeals to the reader's emotions by stating simply that it is dangerous and "really stupid" to use a cell phone while driving; it does not provide any evidence or logic to support the statement. Choice A offers a logical, common-sense argument in that steering one-handed makes driving more dangerous. Choice B refers to statistics of greater accident risk to support the statement that cell phone use while driving is dangerous. Such supporting evidence is an appeal to logic. Choice D cites the fact that many state laws ban cell phone use while driving to support the idea that it is dangerous, and also refers to data on more accidents from doing so. These pieces of supporting evidence also appeal to logic rather than emotion.

32. C: Style. An author writing a humorous book will use a different style than an author writing a biography.

33. C: Neologisms (from *neo-* meaning "new"), also known as "creative coinages," are new words sometimes invented by people which then become parts of our vocabulary. The word "quark" was first coined by the great Irish author James Joyce; he used it in his last novel, *Finnegans Wake*. The physicist Murray Gell-Mann then chose this word from Joyce's work to name the model of elementary particles he proposed (also proposed concurrently and independently by physicist George Zweig) in 1964. Blending (A) is another way new words come into our language; for example, "moped" is a blend of the respective first syllables of "motor" and "pedal." Conversion (B), also called functional shift, changes a word's part of speech. For example, the common nouns "network," "microwave," and "fax," along with the proper noun "Google" have all been converted to verbs in modern usage. Onomatopoeia (D) means words that imitate associated sounds, such as "meow" and "click."

34. B: Point of view. The point of view is generally first or third person. Stories in the second person exist, but these are rare.

35. A: The haiku, originating in Japanese poetry and since adopted in English-language poetry, is a short poem of only three lines, often with 17 syllables, with the first and third lines having five syllables and the second line having seven syllables. (In Japanese there are many other rules, which become very complicated.) Haiku are typically unrhymed, so they do not have a rhyme scheme (B). Similarly, they do not employ any regular meter (C). Because haiku are typically 17 syllables or fewer, they do not involve long narratives (D).

36. A: The *Wild Whale Watch*, part of the Magic School bus series, a chapter book about whales. First graders love to listen to chapter books, but most first graders are not quite able to read chapter books on their own. The undersea fictional adventures in this book will impart a great deal of marine information while simultaneously capturing students' attention with the story. The *Whale Watchers Guide* is not a good choice since the class is not planning a whale watching trip. *Moby Dick* is a well-known adult book, which first graders would not understand. *The Pacific Ocean* will probably offer a lot of marine information, but may not capture first graders' interests.

37. C: In addition to plot, character, setting, and theme, a nonfictional work will also introduce interpretations, theories, and research. For example, a biography is a type of nonfiction that may have plot, character, setting, and theme, and in addition it will introduce interpretations and theories (of the person's life and actions) as well as evidence of the author's research.

38. D: Write thoughts and ideas without stopping to edit them. Freewriting is a prewriting strategy that asks the writer to simply write without any internal editing or concern about formalities, such as spelling or punctuation. The purpose of freewriting is to get the flow of ideas going.

39. C: Class composition and preferences. Before selecting literature for the classroom, the teacher needs to assess the class, considering where they are with their reading skills and what their current interests are. After determining these things, the teacher would next evaluate books that seem appropriate for this particular group of children in terms of plot, character, and reading level.

40. B: Correct and accurate facts are not part of the basics of writing to a particular audience. Some writing for some audiences will not be factual at all, for example, a fairy tale written for young children. The basics of writing to a particular audience include precise vocabulary, figurative language, and illustrations or examples.

Sample constructed response

Charlie's response demonstrates that he is able to recognize key words and pull from his personal experiences to make some sense of the material he is reading. Charlie clearly employs a strategy of identifying and remembering specific content words and phrases, such as "red-light" and "run." These are likely sight words, which he has frequently come into contact with before. Making a meaningful connection with the words which he does know, he extrapolates that a young boy is learning about crossing a street safely. This is a great strategy which will help Charlie out when encountering new words later on.

Charlie is straightforward about having missed details. He indicates this by using the phrase "I think" in the fourth and sixth lines of the transcript. He probably does not have the reading recognition skills to easily notice words and phrases he probably knows well, but has not encountered in a written format. The phrase, "plays a new game," would have been a very good phrase for Charlie to notice to have a more full understanding of what the story was about. Charlie is good at recognizing some words and phrases but relies more on his context clues than trying to work through unknown words. In response, it would be effective to re-read the story with Charlie phrase by phrase and have him work his way through the words which he does not know. Making use of his verbal response, I would try to have Charlie point out the details for why he thinks the boys are talking about crossing the street. This helps Charlie learn to independently look for details which can help him understand. When he comes across words which he does not recognize, I would have him try to sound out and write them down for himself to improve vocabulary recognition and reading retention.

This strategy would be effective for addressing Charlie's reading comprehension weaknesses by helping him learn to identify the words he knows and the words which he does not know. Charlie is likely in a rush to finish this activity as he did not seem to put much effort into working through more difficult words. One of his biggest needs is to slow down and go through each word so that he does not miss important details later on. One way of helping him keep track would be to ask him step by step the five W questions to identify key facts before trying to come up with a solution. This

strategy needs to be accompanied by praise when Charlie recognizes missed words and when he realizes where he missed the key points of the passage.

Mathematics

1. C: Using the points $(-3, 1)$ and $(1, -11)$, the slope may be written as $m = \frac{-11-1}{1-(-3)}$ or $m = -3$. Substituting the slope of -3 and the x- and y-values from the point $(-3, 1)$, into the slope-intercept form of an equation gives $1 = -3(-3) + b$, which simplifies to $1 = 9 + b$. Subtracting 9 from both sides of the equation gives $b = -8$. Thus, the linear equation that includes the data in the table is $y = -3x - 8$.

2. D: All of the above. Geometric figures can be classified in a number of ways, including the number of sides, the angles where sides meet, and as polygons or solids.

3. D: When the dress is marked down by 20%, the cost of the dress is 80% of its original price; thus, the reduced price of the dress can be written as $\frac{80}{100}x$, or $\frac{4}{5}x$, where x is the original price. When discounted an extra 25%, the dress costs 75% of the reduced price, or $\frac{75}{100}\left(\frac{4}{5}x\right)$, or $\frac{3}{4}\left(\frac{4}{5}x\right)$, which simplifies to $\frac{3}{5}x$. So the final price of the dress is three-fifths of the original price.

4. C. The number 589 can be estimated to be 600. The number 9 can be estimated to be 10. The number of chicken nuggets is approximately 600×10, which is 6,000 nuggets. Therefore, the correct choice is C.

5. B: A place value system. That is the system that requires the position of a digit in a number to determine the digit's value. For example, in the number 123, the digit two is in ten's place, and its value is 20.

6. A: Bar graph. A bar graph is used to compare quantities. A circle is used to compare parts of a whole. A pictograph shows comparison of quantities using symbols. A line graph shows trends over a period of time.

7. B: Fractions. Students can manipulate the different lengths of materials like paper strips and Cuisenaire rods, in order to determine that one rod is one half the length of the other, for example.

8. B: The equation $y + 3 = 7$ is solved by subtracting 3 from both sides to yield $y = 4$. Substituting $y = 4$ into $x - 1 = y$ yields $x - 1 = 4$. Adding 1 to both sides of this equation yields $x = 5$. Therefore, the correct choice is B.

9. B: Reflection. One triangle faces the other. They are alike in all other ways. In a rotation, two like figures are rotated about a central point. A translation is a change in the position of a geometric figure. Magnification refers to a change in size of the figure.

10. D: The total rainfall is 25.38 inches. Thus, the ratio $\frac{4.5}{25.38}$, represents the percentage of rainfall received during October. $\frac{4.5}{25.38} \approx 0.177$ or 17.7%.

11. C: There are 36 months in 3 years. The following proportion may be written: $\frac{450}{3} = \frac{x}{36}$. The equation $3x = 16200$, may be solved for x. Dividing both sides of the equation by 3 gives $x = 5,400$.

12. A: Moving the decimal point two places to the right. For example, the decimal 3.42 stands for 342.0 percent of something.

13. B: The histogram only shows that there are eight trees between 70 and 75 feet tall. It does not show the individual heights of the trees. That information cannot be obtained from this graph. Therefore, the correct choice is B.

14. B: Word associations require a student to pull from previous knowledge or experience. For example, if the student is presented with the word "aardvark" but has never seen or heard of an The settlers had not brought enough aardvark, he or she will not be able to make associations. While word association may be a good activity for students after they have reviewed the vocabulary words, it may be counterproductive if the students are unfamiliar with the words. Teachers should also be mindful of cultural differences that may account for a variation in previous knowledge.

15. C: Second. Ordinal numbers are first, second, third, fourth, etc.

16. A: The sum of 3 and the product of each term number and 5 equals the term value. For example, for term number 4, the value of 23 is equal to 5(4) + 3, or 23.

17. B: Length and width. Since the object is not a solid, no other dimensions are needed.

18. C: Since the ratio of wages and benefits to other costs is 2:3, the amount of money spent on wages and benefits is $\frac{2}{5}$ of the business's total expenditure. $\frac{2}{5} \cdot \$130,000 = \$52,000$.

19. C: If x is a prime number and that the greatest common factor of x and y is greater than 1, the greatest common factor of x and y must be x. The least common multiple of two numbers is equal to the product of those numbers divided by their greatest common factor. So, the least common multiple of x and y is $\frac{xy}{x} = y$. Therefore, the values in the two columns are the same.

20. B: The relationship between multiplication and addition. By performing these activities, students will see that multiplication is just the repetitive addition of a number a certain number of times.

21. D: Number lines can help students understand the concepts of positive and negative numbers. Fraction strips are most commonly used with fractions. Venn diagrams are commonly used when comparing groups. Shaded regions are commonly used with fractions or percentages. Therefore, the correct choice is D.

22. B: Problem solving. Because an item is missing in the middle of the pattern, the process asked for cannot be counting or addition. Solving this puzzle does not involve manipulation of objects.

23. C: The slope of a line can be found from any two points by the formula $slope = \frac{y_2 - y_1}{x_2 - x_1}$. A quick sketch of the point in choice C reveals a line with a negative slope. Substituting the last two points into the formula yields $slope = \frac{-3 - 1}{0 - (-6)}$ which reduces to $\frac{-4}{6}$ or $\frac{-2}{3}$. The points in choice A form a line

with a positive slope. The points in choice B form a line with a negative slope of $\frac{-3}{2}$. The points in choice D form a horizontal line. Therefore, the correct choice is C.

24. C: Students learn to measure something larger than a unit by repetitive use of that unit.

25. D: Commutative. The property that states that the order in which numbers are added does not change the answer is called the commutative property.

26. A: The inequality will be less than or equal to, since he may spend $100 or less on his purchase.

27. B: Notice that choice C cannot be correct since $x \neq 1$. ($x = 1$ results in a zero in the denominator.)

$$\frac{x-2}{x-1} = \frac{x-1}{x+1} + \frac{2}{x-1}$$
$$(x-1)(x+1)\left(\frac{x-2}{x-1} = \frac{x-1}{x+1} + \frac{2}{x-1}\right)$$
$$(x+1)(x-2) = (x-1)^2 + 2(x+1)$$
$$x^2 - x - 2 = x^2 - 2x + 1 + 2x + 2$$
$$x^2 - x - 2 = x^2 + 3$$
$$-x = 5$$
$$x = -5$$

28. A: To a convert a percent to a fraction, remove the percent sign and place the number over 100. That means 15% can be written as $\frac{15}{100}$, which reduces to $\frac{3}{20}$. To covert a percent to a decimal, remove the percent sign and move the decimal two places to the left. To convert a percent to a ratio, first write the ratio as a fraction, and then rewrite the fraction as a ratio. Therefore, the correct choice is A.

29. D: Since she spends at least $16, the relation of the number of packages of coffee to the minimum cost may be written as $4p \geq 16$. Alternatively, the inequality may be written as $16 \leq 4p$.

30. D: The area of the square is equal to $(30)^2$, or 900 square centimeters. The area of the circle is equal to $\pi (15)^2$, or approximately 707 square centimeters. The area of the shaded region is equal to the difference of the area of the square and the area of the circle, or 900 cm^2 – 707 cm^2, which equals 193 cm^2. So the area of the shaded region is about 193 cm^2.

31. C: The mean is the average of the data and can be found by dividing the sum of the data by the number of data: $\frac{16 + 18 + 20 + 21 + 34 + 45 + 49}{7} = 29$. The median is the middle data point when the data are ranked numerically. The median is 21. Therefore, the correct choice is C.

32. D: Understand what the problem is asking. Before you can solve a problem, you must decide what it is about.

33. D: Adding zero. Adding zero does not assist students in understanding subtraction. Physically taking some objects away from an array of objects, working a problem with a missing addend like 7 + ___ = 13 helps students learn that 13-7 = 6. Moving to the left on a number line is another way of helping students understand subtraction.

34. B: The perimeter is equal to the sum of the lengths of the two bases, 2 and 6 units, and the diagonal distances of the other two sides. Using the distance formula, each side length may be represented as $d = \sqrt{20} = 2\sqrt{5}$. Thus, the sum of the two sides is equal to $2\sqrt{20}$, or $4\sqrt{5}$. The whole perimeter is equal to $8 + 4\sqrt{5}$.

35. B: Sophia needs to find multiples of 3 (3, 6, 9, 12, 15...) and multiples of 4 (4, 8, 12, 16,...) and find the least common multiple between them, which is 12. The greatest common divisor of 3 and 4 is 1. The least common divisor between two numbers is always 1. The greatest common multiple can never be determined. Therefore, the correct choice is B.

36. D: Since a and b are even integers, each can be expressed as the product of 2 and an integer. So, if we write $a = 2x$ and $b = 2y$, $3(2x)^2 + 9(2y)^3 = c$.
$$3(4x^2) + 9(8y^3) = c$$
$$12x^2 + 72y^3 = c$$
$$12(x^2 + 6y^3) = c$$
Since c is the product of 12 and some other integer, 12 must be a factor of c. Incidentally, the numbers 2, 3, and 6 must also be factors of c since each is also a factor of 12.

37. C: The slope is equal to 4 since each ticket costs $4. The y-intercept is represented by the constant fee of $30. Substituting 4 for m and 30 for b into the equation $y = mx + b$ gives $y = 4x + 30$.

38. B: A cube has six square faces. The arrangement of these faces in a two-dimensional figure is a net of a cube if the figure can be folded to form a cube. Figures A, C, and D represent three of the eleven possible nets of a cube. If choice B is folded, however, the bottom square in the second column will overlap the fourth square in the top row, so the figure does not represent a net of a cube.

39. A: Nominal data are data that are collected which have no intrinsic quantity or order. For instance, a survey might ask the respondent to identify his or her gender. While it is possible to compare the relative frequency of each response (for example, "most of the respondents are women"), it is not possible to calculate the mean, which requires data to be numeric, or median, which requires data to be ordered. Interval data are both numeric and ordered, so mean and median can be determined, as can the mode, the interval within which there are the most data. Ordinal data has an inherent order, but there is not a set interval between two points. For example, a survey might ask whether the respondent whether he or she was very dissatisfied, dissatisfied, neutral, satisfied, or very satisfied with the customer service received. Since the data are not numeric, the mean cannot be calculated, but since ordering the data is possible, the median has context.

40. C: Solving for x in an equation. Young children are not ready for algebraic equations, but they can learn to recognize patterns by counting by twos, comparing geometric shapes, and analyzing data they have collected.

Sample constructed response

In the skill of visually assembling fractions with counters, a student must understand multiple steps of a process. This process involves first dividing the pieces into appropriate groups based on the

denominator. Then the student must draw his groupings and finally select and color in the proper number representing the numerator. In this exercise, Calvin was given twelve small candies, which he grouped appropriately in each of the five problems given to him. Calvin did very well to split the candies equally and into the proper number, which shows a strong understanding of grouping by denominator. This is shown in his splitting twelve into two groups in question 1, four groups in questions two and five, three groups in question three, and finally six groups in question four. Calvin also demonstrates that he knows that the numerator can change, as is demonstrated in question five. He does not seem to grasp this rule fully, however, as demonstrated by his always coloring only one group in questions two, three, and four. Calvin is in specific need of having numerators demonstrated thoroughly.

At this point in Calvin's understanding, he cannot proceed in further instruction in fractions without having a more clear understanding of variance possible in numerators. Instructional intervention should build from his understanding of denominators to isolate his need. This would best be approached by starting with a fraction he can recognize, such as one fourth. I would ask Calvin to identify the fraction and then show him two fourths. At this point, Calvin should independently come to the conclusion that one fourth and two fourths are differentiated by the change in colored in markers rather than by the number of groups. This form of instruction is best suited to one on one intervention, rather than as a class. Once Calvin has been capable of showing the differences between each of the fourth fractions, I would then change the denominator and have him work through similar exercises with thirds, fifths, and sixths with an increasing degree of independence.

Following the independent instruction, Calvin should be given the opportunity to make corrections to his worksheet and asked to explain what he did wrong before. This would be an adequate way of assessing Calvin's level of understanding following the instructional intervention. After proceeding through corrections, Calvin should also be given plenty of opportunity to practice over the following week. Calvin's strong skills in denominators are likely to have strong foundation, but in areas that are new or weaker, retention of new instruction may be an issue. Additional practice is supportive in building retention of new skills.

Arts and Sciences

1. A: Testing, observing, and recording data. Before drawing a conclusion about a hypothesis, one should test and observe it and record data about the test results.

2. A: Density is mass per volume, typically expressed in units such as g/cm^3, or kg/m^3.

3. B: Mass. Mass is the amount of matter in an object. Weight is the measure of the pull of gravity on an object.

4. B: Hydrosphere. The earth's environment consists of the atmosphere, (the air we breathe), the hydrosphere (water), and the lithosphere (the land).

5. B: Large buildings with visible exteriors made almost entirely of glass are often considered to be designed as such for aesthetic architectural purposes, although there are practical advantages. One of these is the insulating property of glass, a particularly useful aspect on very tall buildings, where the ambient outside temperatures and wind patterns are irregular and undesirable. Little support is provided by glass walls, so these buildings usually have a core of steel girders. Decoration is by definition not a practical purpose, nor does glass help issues of tenant privacy.

6. B: Technology often results from scientific discoveries. The relationship between science and technology is evident when scientific discoveries prompt technologic advances.

7. A: It is the only way to prove that an experiment is valid. If an experiment can't be successfully repeated with the same outcome, one cannot determine that the experimental results are valid. Repetition is the key to scientific progress.

8. D: Both liquids and gases are fluids and therefore flow, but only gases are compressible. The molecules that make up a gas are very far apart, allowing the gas to be compressed into a smaller volume.

9. C: The greater the mass of an object, the greater the force necessary to move it. A shot put has greater mass than a tennis ball; therefore, more force is required to throw it a certain distance than is required to a throw a tennis ball the same distance (conversely, less force is required to throw the tennis ball that distance than the shot put). Option A does not explain the difference (both the tennis ball and the shot put are governed by the principle of inertia, meaning that force must be applied to both to set them in motion). Potential energy does not explain the difference in necessary force; neither is it clear that the tennis ball has more potential energy – this eliminates option B. Typically to throw both the tennis ball and the shot put, one would throw them horizontally; this doesn't explain the difference in necessary force (this eliminates option D).

10. Ocean currents. Wind belts, the Earth's orbit, and atmospheric conditions have some effect on weather, but ocean currents have the greatest influence.

11. C: Try out the proposed solution. The first step is to identify a problem and propose a solution. Trying the solution comes next, followed by evaluation and reporting the results.

12. B: Length and width. Since the object is not a solid, no other dimensions are needed.

13. D: Exhaust fumes are an ever-present concern, while the others are incidents that might or might not occur. A combustion engine of any kind produces fumes which can rapidly cause health damage, brain damage or death if allowed to fill an inadequately ventilated space. Therefore activities of this kind are usually conducted near an open garage door or loading dock if not out-of-doors. A situation guaranteed to happen--the production of fumes--is of higher priority than incidental dangers.

14. C: Catalysts lower the energy barrier between products and reactants and thus increase the reaction rate.

15. C: In a uniform gravitational field, such as occurs near Earth's surface, an object will move like a point mass located at the center of mass. However, this does not necessarily mean that the geometrical center of an object is the same as its center of mass, depending on its shape, design and mass distribution. The center of mass of a sphere or cube is at its geometric center because you can imagine the sphere as consisting of a large number of point masses located at certain points in space. Multiplying the point masses by their location and dividing by the total mass gives the center of mass. I is not true because the space station may not be completely symmetrical. III is true because the space station is undergoing uniform circular motion around Earth. If the orbit had been elliptical, this would not be true because the speed would have changed depending on the station's position. However, even though the speed is constant in a circular orbit, the velocity is not. Since velocity has a direction associated with it, and the space station is moving in a circular path, its velocity is constantly changing.

16. C: Food, water, sunlight, and air. All living organisms need food, water, sunlight and air. Shelter, space, and nurturing are nice to have but not crucial to sustaining life.

17. C: The agricultural revolution. A dependable food supply is essential to all populations. The agricultural revolution, an organized, almost scientific approach to agriculture, increased the food supply necessary for a growing world population.

18. D: A flow-line map describes the movement of people, trends, or materials across a physical area. The movements depicted on a flow-line map are typically represented by arrows. In more advanced flow-line maps, the width of the arrow corresponds to the quantity of the motion. Flow-line maps usually declare the span of time that is being represented. A political map depicts the man-made aspects of geography, such as borders and cities. A cartogram adjusts the size of the areas represented according to some variable. For instance, a cartogram of wheat production would depict Iowa as being much larger than Alaska. A qualitative map uses lines, dots, and other symbols to illustrate a particular point. For example, a qualitative map might be used to demonstrate the greatest expansion of the Persian Empire.

19. B: The child is developing normally; typical of his age group, he is in the preoperational stage of development and has not yet mastered conservation. Conservation is the ability to use logical reasoning to determine quantity. In this case, the child thinks one glass has more water simply because the glass is bigger. As this child enters into the concrete operational stage of development, he will understand that two amounts can be equal despite the size or shape of the container they are in. However, since this skill is not yet developed, the child will continue to believe one has more. If the teacher pours the water from the bigger glass into a glass that equals the size of his classmate's, the child will have a different reaction and possibly think the two are now equal.

20. B: Structural unemployment is unemployment that results from a mismatch of job skills or location. In this case, Ivy's job skill—her ability to work as a seamstress—is no longer desired by employers. Frictional and cyclical are other forms of unemployment; economists do not use the term careless unemployment.

21. B: The right of a defendant to confront accusers and to provide a defense.

22. C: The cycle of demographic transition is best illustrated by a line graph. Demographic transition is a phenomenon in which a region's growth rate increases rapidly, peaks, and then decreases slowly over a long time. In the early phase of a region's development, both the birth and death rates are high, which can cause the population to fluctuate. As the people of the region become settled, the growth rate calms down, and the region enters a period of rapid increase. Political maps are better at depicting borders and the locations of cities, while pie charts are better at representing proportions. Flow-line maps are good for illustrating the movement of people, goods, or trends across a physical area.

23. D: Political corruption was not an immediate effect of the rapid urban growth during this time. The accelerated growth of cities in America did soon result in services being unable to keep up with that growth. The results of this included deficiencies in clean water delivery and garbage collection, causing poor sanitation (a). That poor sanitation led to outbreaks of cholera and typhus, as well as typhoid fever epidemics (b). Police and fire fighting services could not keep up with the population increases, and were often inadequate (c). With people moving to the cities at such a fast rate, there were also deficits in housing and public transportation.

24. D: These are all geographically parts of Southeast Asia. The countries of Myanmar (Burma), Laos, Cambodia, and Thailand (a) are considered Mainland Southeast Asia, as are Vietnam and the Malay Peninsula (b). Brunei (b), East Malaysia, Indonesia, and the Philippines (c) are considered Maritime Southeast Asia, as are Singapore and Timor-Leste. The Seven Sister States of India are also considered to be part of Southeast Asia, geographically and culturally. (The Seven Sister States of India are Arunachal Pradesh, Assam, Nagaland, Meghalaya, Manipur, Tripura, and Mizoram, which all have contiguous borders in northeastern India.)

25. B: The social interaction of students that aid or inhibit learning. According to these theories, students do not just learn in isolation or in a one-on-one relationship with a teacher. They also learn attitudes toward education from their peers, sometimes positive and sometimes negative.

26. D: While rising prices may hurt many members of an economy, those same rising prices may benefit other members of the same economy. For example, rising prices may help those who sell goods and services and are able to keep their costs of production low, increasing their profit margin. Meanwhile, rising prices can hurt consumers because their income is now able to purchase fewer goods and services than before.

27. C: Regulate intrastate trade. Intrastate trade is solely within a state, so the state has jurisdiction over it. Taxation is a right granted to both federal and state authorities. Declaring war is a national decision. Patents and copyrights apply to goods made and/or sold throughout the country; therefore, they are a federal responsibility.

28. A: A smaller box in which some part of the larger map is depicted in greater detail is known as an inset. Insets provide a closer look at parts of the map that the cartographer deems to be more important (for instance, cities, national parks, or historical sites). Often, traffic maps will include

several insets depicting the roads in the most congested area of the city. Legends, also known as keys, are the boxes in which the symbols used in the map are explained. A legend, or key, might indicate how railroads and boundaries are depicted, for example. A compass rose indicates how the map is oriented along the north-south axis. It is common for cartographers to tilt a map for ease of display, such that up may not be due north.

29. D: Resentment against the Protestant Reformation was not a cause given for the French Revolution. Choices (a), (b), and (c) are just a few among many causes cited for the war. Famines caused malnutrition and even starvation among the poorest people (a). Escalating bread prices contributed greatly to the hunger. Louis XV had amassed a great amount of debt from spending money on many wars in addition to the American Revolution. Military failures as well as a lack of social services for veterans exacerbated these debts. In addition, the Court of Louis XVI and Marie Antoinette spent excessively and obviously on luxuries even while people in the country were starving, and France's monetary system was outdated, inefficient, and thus unable to manage the national debt (b). Much of the populace greatly resented the Catholic Church's control of the country (c). However, there was not great resentment against the Protestant Reformation (d); there were large minorities of Protestants in France, who not only exerted their influence on government institutions, but undoubtedly also contributed to the resentment of the Catholic Church. Because (d) is not a cause of the French Revolution as the other choices are, answer, all of these, is incorrect.

30. B: The composite volcano, sometimes called the stratovolcano, is the most common type of volcano on earth. A composite volcano has steep sides, so the explosions of ash, pumice, and silica are often accompanied by treacherous mudslides. Indeed, it is these mudslides that cause most of the damage associated with composite volcano eruptions. Krakatoa and Mount Saint Helens are examples of composite volcanoes. A lava dome is a round volcano that emits thick lava very slowly. A shield volcano, one example of which is Mt. Kilauea in Hawaii, emits a small amount of lava over an extended period of time. Shield volcanoes are not known for violent eruptions. A cinder cone has steep sides made of fallen cinders, which themselves are made of the lava that intermittently shoots into the air.

31. B: Play teaches children cooperation and sharing. Play is one way a child learns to relate to other children in a positive way.

32. A: Answer B is a definition of gross national product, and answers C and D define other economic measures.

33. B: Dimension, texture, and space are all *elements* of art, while unity is one of the *principles* of art. Unity in artwork is achieved when an artist's use of the elements produces a sense of wholeness or completeness in the finished product.

34. C: When encountering a difficult passage, musicians most effectively practice that passage slowly and thoughtfully. Playing through a challenging passage quickly can be detrimental to the learning process. Studying away from the instrument and practicing the sections before and after can be helpful, but will not address the difficult passage in the most effective manner.

35. D: Director placement of an actor onstage could be considered *positioning*, but the technical theatre term is *blocking*, so answer choice A is incorrect. Staging is related to set design and prop placement, and has nothing to do with the placement of actors. Therefore, answer choice B can be eliminated. Choreography is related to actor placement onstage, but only when specific dance movements are involved, making answer choice C incorrect.

36. A: Young people generally feel themselves to be invincible and show little regard for the future consequences of their behavior. More immediate concerns are shortages of cash, romantic rejection, and athletic inadequacy.

37. B: To develop perceptual-motor skills, it is best to engage students in physical activities that they find fun or enjoyable and that can be described and taught in terms of particular steps. These activities should involve uses of the senses such as sight, hearing, and touch. For example, shooting hoops can be described in particular steps, it involves holding and throwing a basketball, and seeing the basketball hoop. If shooting hoops is an activity students enjoy, this is a good activity to help students develop perceptual-motor skills. Answer A and C can be rejected because it is best to use activities that involve sequential steps; answer D can be rejected because it does not involve steps, nor necessarily significant motor skills (for example, watching a movie involves hearing and seeing, but it is not a way to build perceptual-motor skills in adolescents).

38. B: Conventional. There is actually a hint to this answer in its name. According to Kohlberg, the stage of development during which children learn conventional behavior—e.g., good behavior—is the Conventional Stage.

39. C: Purchasing a DVD is a discretionary expense because it is based on personal desire rather than need. In other words, it is an expense made at the discretion of the consumer. Discretionary expenses are those over which a consumer has the most control. A comprehensive budget must include discretionary expenses as well as fixed and variable expenses. Fixed expenses, such as rent, are the same every month. Variable expenses, including groceries and school supplies, vary in amount over the course of a year.

40. D: Restaurants are the most common employer of high-school students, based on data from the United States Bureau of Labor Statistics. These students will have direct experience with the cost of food, as well as with the nutritional choices available in a restaurant.