

# PRACTICE TEST 19

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## Practice Test 1

### Reasoning Through Language Arts

**Directions:** This test consists of 10 questions that assess your reading comprehension and language skills. Read each passage carefully, then answer the questions that follow.

**Passage 1:** Excerpt from "The Future of Work" by Emily Richardson

The widespread adoption of artificial intelligence and automation technologies is rapidly transforming the workplace. Many routine jobs that once provided stable employment are being replaced by machines and algorithms. According to the Bureau of Labor Statistics, nearly 47% of all U.S. jobs could be at risk of automation within the next two decades. However, this technological revolution is also creating new opportunities. Jobs requiring creativity, emotional intelligence, and complex problem-solving—skills that machines cannot easily replicate—are expanding.

Workers must adapt to this changing landscape by developing skills that complement rather than compete with technology. The most successful employees of the future will be those who can work alongside intelligent machines, using technology to enhance their own capabilities. Educational institutions are beginning to respond by emphasizing adaptability, critical thinking, and technological literacy in their curricula. Companies are also investing in retraining programs to help their workforce transition to more technology-enhanced roles.

While these changes create uncertainty, historical patterns suggest that technological advancement ultimately creates more jobs than it eliminates. The challenge lies in managing the transition period, which may be difficult for workers whose skills no longer match market demands. Policymakers, businesses, and educators must collaborate to ensure that the benefits of automation are widely shared and that workers have opportunities to thrive in the new economy.

#### **Question 1: Multiple-Choice**

Based on the passage, which statement best summarizes the author's view of automation in the workplace?

A. Automation is an inevitable disaster that will eliminate half of all jobs.

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- B. Automation poses challenges but also creates opportunities for those with the right skills.
- C. Educational institutions are failing to prepare students for future employment.
- D. Companies should halt automation to protect current jobs.

**Question 2: Multiple-Choice**

Which sentence from the passage best supports the idea that certain human abilities will remain valuable despite automation?

- A. "The widespread adoption of artificial intelligence and automation technologies is rapidly transforming the workplace."
- B. "According to the Bureau of Labor Statistics, nearly 47% of all U.S. jobs could be at risk of automation within the next two decades."
- C. "Jobs requiring creativity, emotional intelligence, and complex problem-solving—skills that machines cannot easily replicate—are expanding."
- D. "The challenge lies in managing the transition period, which may be difficult for workers whose skills no longer match market demands."

**Question 3: Drop-Down**

In the phrase "workers must adapt to this changing landscape," the word "landscape" most nearly means:

(Circle your selection)

- natural scenery
- artistic representation
- geographical region
- environment or situation

**Passage II:** Excerpt from "The Power of Habit" by Charles Duhigg

When researchers at MIT began analyzing the mental activities of rats in a maze, they found something surprising: as the rats learned to navigate the maze, their mental activity decreased. As a rat was introduced to a new maze, its brain would work furiously as it sniffed corners and scratched walls. But after running the same route multiple times, the rat's neurological activity declined until only the beginning and end of the maze triggered significant mental action.

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The researchers discovered that the rats were developing habits. Once a routine was established—a habit loop of cue, routine, and reward—the rats' brains could essentially power down into an automatic mode. This process is at the core of how habits form and persist. First, there is a cue, a trigger that tells your brain to go into automatic mode. Then there is the routine, which can be physical, mental, or emotional. Finally, there is a reward, which helps your brain determine if this particular loop is worth remembering.

Understanding these components gives us remarkable power over our behavior. By identifying the cues and rewards that drive our habits, we can change the routines that define our lives. This insight has been applied everywhere from weight loss programs to addiction treatment. The golden rule of habit change is that you cannot extinguish a bad habit; you can only change it by substituting a new routine while keeping the same cue and reward.

#### **Question 4: Drop-Down**

According to the researchers, when rats became familiar with a maze, their brain activity:

(Circle your selection)

- increased throughout the entire maze
- remained constant from start to finish
- decreased except at the beginning and end
- stopped completely until they received a reward

#### **Question 5: Drag and Drop**

Arrange the components of the habit loop in the correct order as described in the passage. Write the correct order in the spaces provided.

Components:

- Reward
- Routine
- Cue

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

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### Question 6: Fill in the Blank

Based on the passage, the "golden rule of habit change" states that one cannot \_\_\_\_\_ a bad habit; one can only \_\_\_\_\_ it.

### Passage III: Excerpt from Susan B. Anthony's speech after being arrested for voting (1873)

Friends and fellow citizens: I stand before you tonight under indictment for the alleged crime of having voted at the last presidential election, without having a lawful right to vote. It shall be my work this evening to prove to you that in thus voting, I not only committed no crime, but, instead, simply exercised my citizen's rights, guaranteed to me and all United States citizens by the National Constitution, beyond the power of any state to deny.

The preamble of the Federal Constitution says: "We, the people of the United States, in order to form a more perfect union, establish justice, insure domestic tranquility, provide for the common defense, promote the general welfare, and secure the blessings of liberty to ourselves and our posterity, do ordain and establish this Constitution for the United States of America."

It was we, the people; not we, the white male citizens; nor yet we, the male citizens; but we, the whole people, who formed the Union. And we formed it, not to give the blessings of liberty, but to secure them; not to the half of ourselves and the half of our posterity, but to the whole people—women as well as men.

### Question 7: Multiple-Choice

Based on the passage, what is the primary purpose of Susan B. Anthony's speech?

- A. To apologize for breaking the law
- B. To argue that women should be granted the right to vote in the future
- C. To defend her action by claiming that women already have the constitutional right to vote
- D. To encourage other women to vote illegally in protest

### Question 8: Fill in the Blank

Based on the passage, which specific part of the U.S. Constitution does Susan B. Anthony quote to support her argument?

- Preamble section
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- Article I section
- Article II section
- Bill of Rights section

Write your answer here: \_\_\_\_\_

### Question 9: Drag and Drop

Based on the passage, match each statement with the appropriate category. Write your answers in the spaces provided.

*Statements:*

- Women were explicitly excluded from voting by the Constitution
- The Constitution was established by all people, including women
- The Constitution was designed to secure existing liberties
- Women should be given new rights not found in the Constitution

According to Susan B. Anthony:

1. \_\_\_\_\_
2. \_\_\_\_\_

Contrary to Susan B. Anthony's view:

1. \_\_\_\_\_
2. \_\_\_\_\_

### Question 10: Extended Response

Read the following passage and compare it with Susan B. Anthony's speech.

Excerpt from "Declaration of Sentiments" (Seneca Falls Convention, 1848)

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"We hold these truths to be self-evident: that all men and women are created equal; that they are endowed by their Creator with certain inalienable rights; that among these are life, liberty, and the pursuit of happiness... The history of mankind is a history of repeated injuries and usurpations on the part of man toward woman, having in direct object the establishment of an absolute tyranny over her."

**Question:** Analyze how both texts approach the concept of equality under the law. In your response, compare the rhetorical strategies used in each text and evaluate which approach might be more effective in persuading audiences of the time. Support your analysis with specific evidence from both texts.

Write your response in complete sentences, using proper grammar, spelling, and punctuation. Your response should be between 4-7 paragraphs.

[Write your answer on a separate sheet of paper or type it if you have access to a computer]

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## Mathematical Reasoning

### Part 1: Questions 1-8 (No Calculator Allowed)

#### Question 1: Multiple-Choice

If  $y = 2x - 5$  and  $x = 3$ , what is the value of  $y$ ?

- A. -1
- B. 1
- C. 5
- D. 11

#### Question 2: Multiple-Choice

Solve for  $x$ :  $2(x - 3) + 4 = 3x + 1$

- A.  $x = -3$
- B.  $x = 7$
- C.  $x = 10$
- D.  $x = 11$

#### Question 3: Fill in the Blank

The table shows the price of a sweater at different stores.

| Store | Price   |
|-------|---------|
| A     | \$45.00 |
| B     | \$36.00 |
| C     | \$42.00 |
| D     | \$39.00 |

What is the average (mean) price of the sweater?

\$ \_\_\_\_\_

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**Question 4: Multiple-Choice**

Which of the following is equivalent to  $(3x^2 - 2x + 4) - (x^2 + 3x - 5)$ ?

- A.  $2x^2 - 5x - 1$
- B.  $2x^2 - 5x + 9$
- C.  $4x^2 + x + 9$
- D.  $4x^2 - 5x - 1$

**Question 5: Multiple-Choice**

A car traveled 285 miles on 15 gallons of gas. At this rate, how many miles can it travel on 12 gallons of gas?

- A. 190 miles
- B. 228 miles
- C. 237.5 miles
- D. 356.25 miles

**Question 6: Drop-Down**

The formula for converting temperature from Celsius (C) to Fahrenheit (F) is  $F = (9/5)C + 32$ . If the temperature is  $20^\circ\text{C}$ , the temperature in Fahrenheit is:

- $36^\circ\text{F}$
- $52^\circ\text{F}$
- $68^\circ\text{F}$
- $84^\circ\text{F}$

**Question 7: Multiple-Choice**

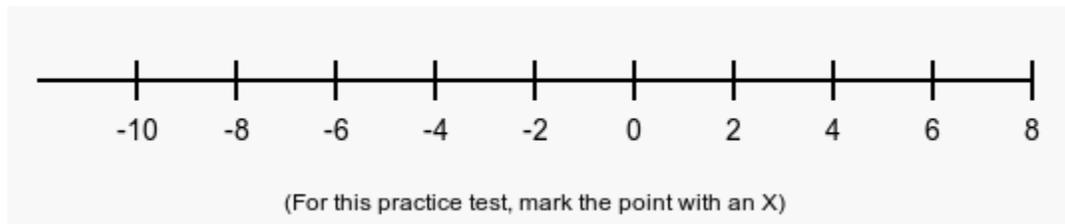
If a rectangular prism has a length of 8 cm, width of 4 cm, and height of 6 cm, what is its volume?

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- A.  $18 \text{ cm}^3$
- B.  $48 \text{ cm}^3$
- C.  $96 \text{ cm}^3$
- D.  $192 \text{ cm}^3$

**Question 8: Hot Spot**

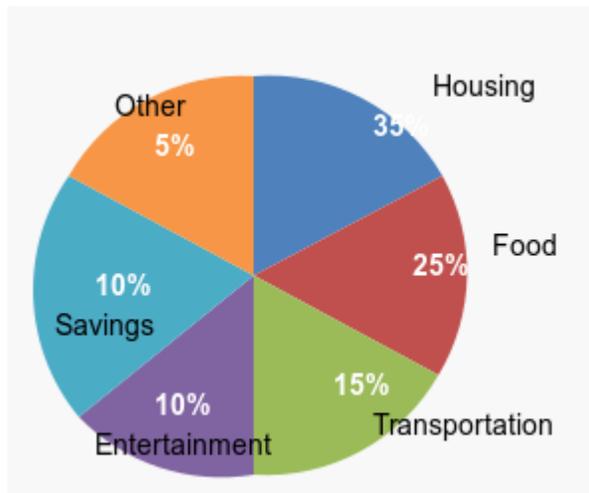
On the number line below, mark the point that represents the value of the expression:  $2(-3) + 7$



**Part 2: Questions 9-15 (Calculator Allowed)**

**Question 9: Multiple-Choice**

The circle graph shows the distribution of Maria's monthly expenses. If her total monthly expenses are \$2,400, how much does she spend on food?



- A. \$480
  - B. \$600
  - C. \$720
  - D. \$840
-

**Question 10: Drag and Drop**

Order the following numbers from least to greatest.

- 3.05
- 3.5
- 3.15
- 3.051

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

**Question 11: Fill in the Blank**

A car rental company charges \$45 per day plus \$0.25 per mile. If John rented a car for 3 days and drove 180 miles, how much was his bill?

\$ \_\_\_\_\_

**Question 12: Multiple-Choice**

Two angles in a triangle measure  $45^\circ$  and  $60^\circ$ . What is the measure of the third angle?

- A.  $45^\circ$
- B.  $60^\circ$
- C.  $75^\circ$
- D.  $90^\circ$

**Question 13: Multiple-Choice**

If 3 shirts cost \$54, how much would 5 shirts cost at the same rate?

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- A. \$81
- B. \$90
- C. \$108
- D. \$270

**Question 14: Drop-Down**

The side length of a square is 12 units. If the side length is doubled, the area of the new square will be:

- twice the original area
- three times the original area
- four times the original area
- six times the original area

**Question 15: Fill in the Blank**

For a school fundraiser, students sold 125 chocolate bars and 95 bags of popcorn. The chocolate bars cost \$2.50 each, and the bags of popcorn cost \$3.75 each. What was the total amount collected from the sales?

\$ \_\_\_\_\_

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## Social Studies

*Questions 1 through 3 are based on the following passage.*

The Department of Labor operates under the principle that workers have the right to fair treatment and safe working conditions. During the late 19th century, the Industrial Revolution transformed American society, moving production from homes to factories. While this change brought economic growth, it also created dangerous working environments. Workers often labored 12-16 hours per day, six days per week. Factory conditions were hazardous, with poor ventilation, few safety measures, and minimal breaks. Children as young as five years old worked in mills, mines, and factories. In response to these conditions, workers began to organize. The first major national labor union, the Knights of Labor, was formed in 1869, advocating for an eight-hour workday, the end of child labor, and equal pay for equal work regardless of gender or race.

### **Question 1: Multiple-Choice**

Which factor most directly contributed to the formation of labor unions in the late 19th century?

- A. government regulations requiring worker representation
- B. dangerous working conditions and long hours in factories
- C. competition between skilled and unskilled workers
- D. immigration policies that threatened American jobs

### **Question 2: Multiple-Choice**

Based on the passage, which goal was shared by early labor unions?

- A. establishing private healthcare for workers
- B. eliminating the use of machinery in factories
- C. ending the employment of children in industrial settings
- D. preventing immigrants from taking factory jobs

### **Question 3: Drop-Down**

According to the passage, the Knights of Labor advocated for:

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- restricting immigration to protect American jobs
- equal pay for equal work regardless of gender or race
- government ownership of factories and mills
- violent strikes to achieve worker demands

***Questions 4 through 6 refer to the following timeline.***

### **Cold War Timeline**

- 1945: World War II ends; United Nations established
- 1947: Truman Doctrine announced; Marshall Plan implemented
- 1949: NATO formed; Soviet Union tests first atomic bomb
- 1950-1953: Korean War
- 1955: Warsaw Pact formed
- 1961: Berlin Wall constructed
- 1962: Cuban Missile Crisis
- 1963: Nuclear Test Ban Treaty signed
- 1979-1989: Soviet-Afghan War
- 1989: Berlin Wall falls
- 1991: Soviet Union dissolves

### **Question 4: Multiple-Choice**

Which event marked the height of nuclear tension between the United States and Soviet Union?

- A. formation of NATO
- B. construction of the Berlin Wall
- C. Cuban Missile Crisis
- D. Soviet-Afghan War

### **Question 5: Multiple-Choice**

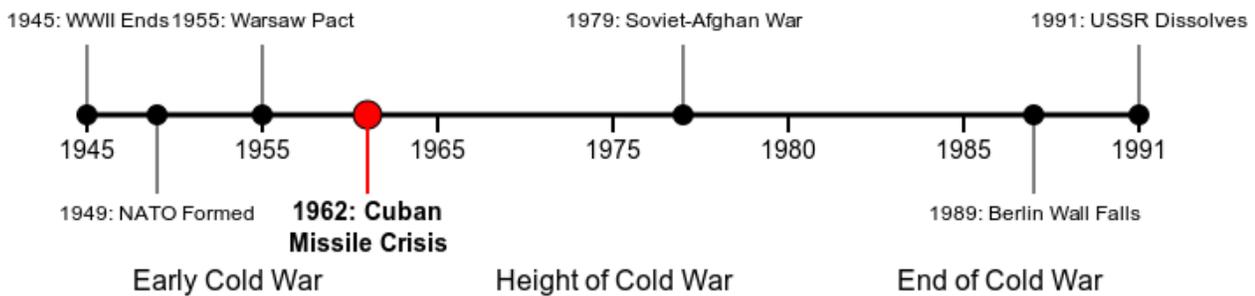
Which best describes the U.S. foreign policy strategy of "containment" during the Cold War?

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- A. directly attacking communist governments
- B. preventing the spread of communism beyond existing communist states
- C. establishing diplomatic relations with all nations
- D. withdrawing from international conflicts entirely

**Question 6: Hot Spot**

On the timeline below, mark the event that represents the formal military alliance created by Western nations to counter Soviet influence.



*Questions 7 and 8 refer to the following excerpt.*

"We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness. — That to secure these rights, Governments are instituted among Men, deriving their just powers from the consent of the governed, — That whenever any Form of Government becomes destructive of these ends, it is the Right of the People to alter or to abolish it, and to institute new Government, laying its foundation on such principles and organizing its powers in such form, as to them shall seem most likely to effect their Safety and Happiness."

**Question 7: Multiple-Choice**

This excerpt comes from which historical document?

- A. U.S. Constitution
  - B. Declaration of Independence
  - C. Bill of Rights
-

D. Federalist Papers

**Question 8: Multiple-Choice**

Which political philosophy most directly influenced the ideas expressed in this document?

- A. Absolutism
- B. Mercantilism
- C. Enlightenment liberalism
- D. Socialism

**Question 9: Fill in the Blank**

The Supreme Court case \_\_\_\_\_ (1954) ruled that racial segregation in public schools was unconstitutional, overturning the "separate but equal" doctrine established in Plessy v. Ferguson.

**Question 10: Multiple-Choice**

The table shows voter turnout in U.S. presidential elections.

| Year | Percentage of Eligible Voters |
|------|-------------------------------|
| 2000 | 54.2%                         |
| 2004 | 60.1%                         |
| 2008 | 61.6%                         |
| 2012 | 58.6%                         |
| 2016 | 60.1%                         |
| 2020 | 66.8%                         |

Which year had the highest voter turnout?

- A. 2004
  - B. 2008
  - C. 2016
  - D. 2020
-

### Question 11: Drag and Drop

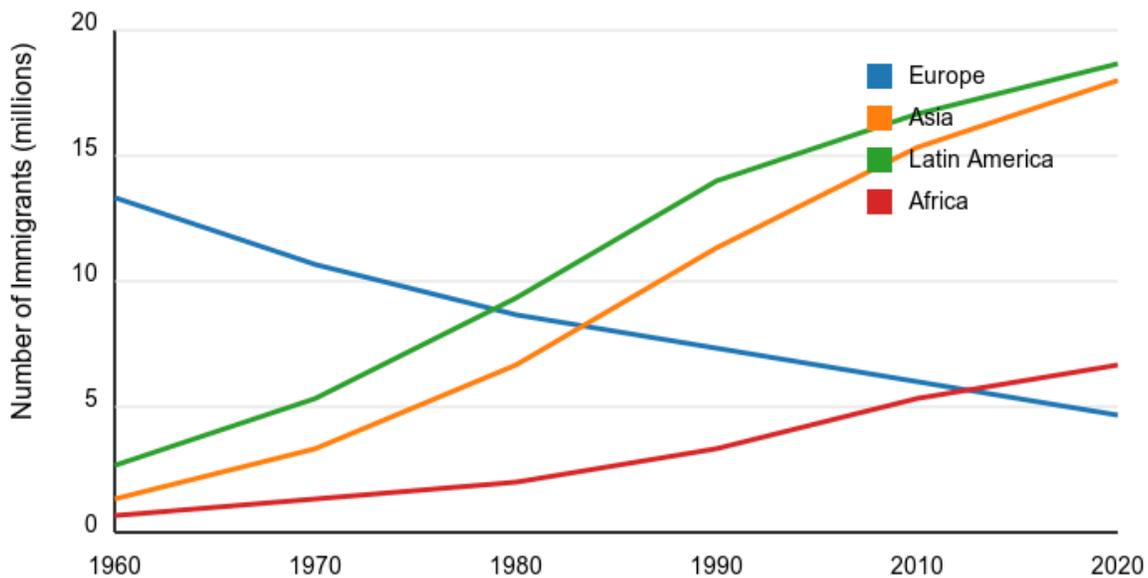
Match each New Deal program with its primary purpose.

- Civilian Conservation Corps (CCC)
- Federal Deposit Insurance Corporation (FDIC)
- Social Security Act
- Tennessee Valley Authority (TVA)

1. \_\_\_\_\_ : Provided jobs for young men in conservation projects
2. \_\_\_\_\_ : Protected bank deposits against bank failures
3. \_\_\_\_\_ : Provided economic security for elderly and unemployed
4. \_\_\_\_\_ : Brought electricity and flood control to rural areas

### Question 12: Multiple-Choice

The graph shows U.S. immigration by region of origin from 1960 to 2020.



Based on the graph, which statement is true?

- A. European immigration has remained consistent since 1960
  - B. Asian immigration has decreased since 2000
  - C. Latin American immigration has increased the most since 1960
-

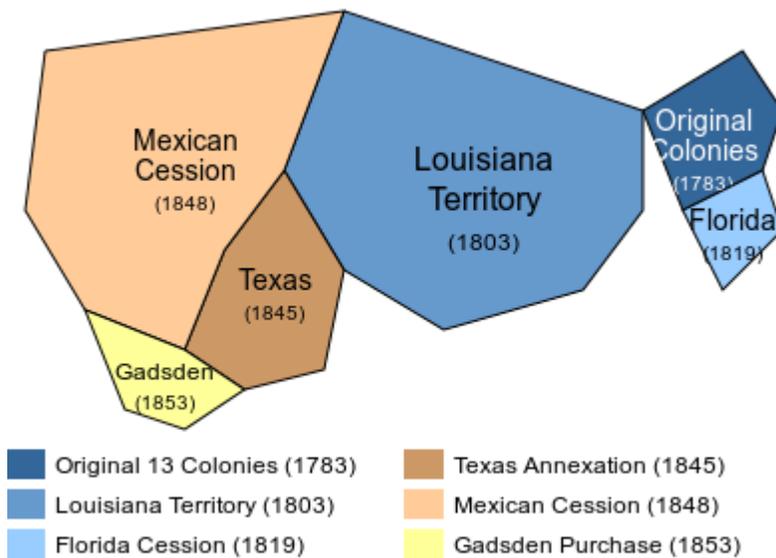
D. African immigration surpassed European immigration by 2020

**Question 13: Fill in the Blank**

The Great Migration, which occurred between 1916 and 1970, involved the movement of approximately 6 million African Americans from the \_\_\_\_\_ to the industrial cities of the North and West.

**Question 14: Multiple-Choice**

The map shows the expansion of the United States from 1783 to 1853.



Which territory was acquired through the 1803 purchase from France?

- A. Florida
- B. Louisiana Territory
- C. Texas
- D. Mexican Cession

**Question 15: Drop-Down**

The economic system in which private individuals and businesses own the means of production and operate for profit with limited government intervention is known as:

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- communism
- socialism
- capitalism
- mercantilism

## **Science**

***Questions 1 and 2 are based on the following information.***

A scientist conducted an experiment to test the effectiveness of four different fertilizers on plant growth. She planted 20 identical tomato seedlings in identical pots with the same soil. She divided the plants into four groups of 5 plants each. Each group received a different fertilizer (labeled W, X, Y, and Z), but all other conditions (water, sunlight, temperature) were kept the same. After 30 days, she measured the average height of plants in each group.

### **Question 1: Multiple-Choice**

In this experiment, what is the independent variable?

- A. Height of the plants
- B. Amount of water
- C. Type of fertilizer
- D. Amount of sunlight

### **Question 2: Multiple-Choice**

What would be the best control group for this experiment?

- A. Plants with no fertilizer
  - B. Plants with fertilizer W
  - C. Plants with twice as much water
-

D. Plants kept in the dark

**Question 3 is based on the following information.**

Cell theory states that:

1. All living things are composed of cells.
2. Cells are the basic unit of structure and function in living things.
3. All cells come from pre-existing cells.

**Question 3: Multiple-Choice**

Which observation would NOT support cell theory?

- A. Bacteria can divide to form identical offspring.
- B. Plant and animal tissues are made up of cells.
- C. Crystals can grow and become more complex.
- D. A one-celled organism carries out all life functions.

**Question 4: Fill in the Blank**

In the water cycle, the process by which water vapor in the air changes to liquid water is called \_\_\_\_\_.

**Question 5: Multiple-Choice**

Which of the following would most likely increase the rate of evaporation in the water cycle?

- A. Decreased air temperature
  - B. Increased humidity
  - C. Increased wind speed
  - D. Decreased sunlight
-

**Question 6 is based on the following information.**

The periodic table organizes elements based on their atomic structure and chemical properties. Elements in the same group (vertical column) have similar chemical properties because they have the same number of electrons in their outer energy level.

**Question 6: Multiple-Choice**

Which statement best explains why elements in the same group of the periodic table have similar chemical properties?

- A. They have the same number of neutrons.
- B. They have the same atomic mass.
- C. They have the same number of valence electrons.
- D. They have the same number of protons.

**Question 7 refers to the following information about Newton's Laws of Motion.**

**Newton's First Law:** An object at rest will remain at rest, and an object in motion will remain in motion with the same speed and direction, unless acted upon by an unbalanced force.

**Newton's Second Law:** The acceleration of an object depends on the mass of the object and the force applied. ( $F = ma$ )

**Newton's Third Law:** For every action, there is an equal and opposite reaction.

**Question 7: Multiple-Choice**

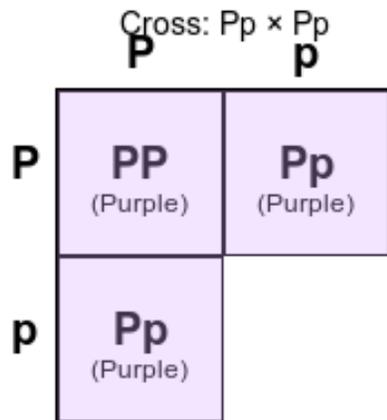
A soccer ball is kicked and rolls across a field, gradually slowing until it stops. Which force is primarily responsible for stopping the ball?

- A. Gravity
  - B. Friction
  - C. Air resistance
-

D. Magnetic force

**Questions 8 and 9 are based on the following information about genetics.**

Pea plants can have either purple flowers (dominant trait, P) or white flowers (recessive trait, p). The following Punnett square shows a cross between two pea plants that are heterozygous for flower color (Pp).



Ratio: 3 Purple : 1 White  
(75% Purple, 25% White)

**Question 8: Multiple-Choice**

According to the Punnett square, what is the probability that offspring from this cross will have purple flowers?

- A. 25%
- B. 50%
- C. 75%
- D. 100%

**Question 9: Multiple-Choice**

Which genotype from this cross would result in white flowers?

- A. PP
  - B. Pp
-

C. pP

D. pp

### Question 10: Drag and Drop

Match each type of energy with an example.

- Potential energy
- Kinetic energy
- Chemical energy
- Electrical energy

1. \_\_\_\_\_ : A moving car
2. \_\_\_\_\_ : A battery
3. \_\_\_\_\_ : A book on a high shelf
4. \_\_\_\_\_ : A household outlet

### Questions 11 and 12 are based on the following information about ecosystems.

An ecosystem includes all the living organisms in a specific area, interacting with each other and with the non-living environment (soil, water, climate). Energy flows through an ecosystem in one direction, typically from sunlight to producers to consumers.

### Question 11: Multiple-Choice

Which of the following correctly lists organisms in order from producer to tertiary consumer?

- A. Grass → Deer → Wolf → Bacteria
  - B. Algae → Fish → Seal → Polar bear
  - C. Oak tree → Squirrel → Hawk → Mountain lion
  - D. Mushroom → Beetle → Mouse → Snake
-

**Question 12: Fill in the Blank**

Energy enters most ecosystems through the process of \_\_\_\_\_, which converts light energy from the sun into chemical energy stored in organic molecules.

**Question 13: Multiple-Choice**

Which statement about DNA structure is correct?

- A. DNA is a single-stranded molecule.
- B. DNA contains the sugar ribose.
- C. Adenine pairs with thymine, and guanine pairs with cytosine.
- D. Proteins are the building blocks of DNA.

**Questions 14 and 15 are based on the following information about the pH scale.**

The pH scale measures how acidic or basic a substance is. The pH scale ranges from 0 to 14, with a pH of 7 being neutral. Substances with a pH less than 7 are acidic, while substances with a pH greater than 7 are basic.

**Question 14: Multiple-Choice**

Which substance is most likely to have a pH greater than 7?

- A. Lemon juice
- B. Black coffee
- C. Pure water
- D. Baking soda solution

**Question 15: Multiple-Choice**

A solution has a pH of 2. When sodium hydroxide (a base) is added to this solution, what will most likely happen to the pH?

- A. It will decrease
-

- B. It will increase
- C. It will remain the same
- D. It will first increase, then decrease

**Question 16 is based on the following information about plate tectonics.**

The theory of plate tectonics states that Earth's outer layer is divided into several plates that slide over the mantle, the rocky inner layer above the core. These plates move relative to one another at boundaries where they meet.

**Question 16: Multiple-Choice**

Which geological feature is most likely to form at a convergent boundary where two continental plates collide?

- A. Mid-ocean ridge
- B. Volcanic island
- C. Mountain range
- D. Rift valley

**Questions 17 and 18 refer to the following scenario about experimental design.**

A researcher wants to test the effectiveness of a new drug for lowering blood pressure. She selects 200 volunteers with high blood pressure. Half of the volunteers receive the new drug, while the other half receive a sugar pill that looks identical to the real drug. Neither the volunteers nor the researcher knows which participants received the real drug until after the study is completed.

**Question 17: Multiple-Choice**

What type of experimental design is described above?

- A. Single-blind study
  - B. Double-blind study
  - C. Control group study
-

D. Case-control study

**Question 18: Multiple-Choice**

Why would the researcher give some participants a sugar pill instead of the real drug?

- A. To save money on research costs
- B. To establish a baseline for comparison
- C. To increase the sample size
- D. To make sure the drug tastes good

**Question 19 is based on the following information about simple machines.**

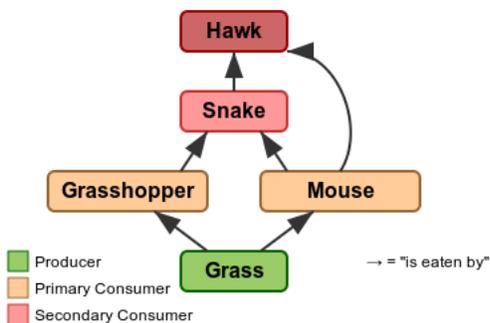
Simple machines make work easier by changing the direction or magnitude of a force. They include the lever, wheel and axle, pulley, inclined plane, wedge, and screw.

**Question 19: Multiple-Choice**

Which of the following is an example of a wedge?

- A. A screwdriver
- B. A seesaw
- C. An axe blade
- D. A door knob

**Question 20 refers to the following image showing a simple food web.**



**Question 20: Multiple-Choice**

If the snake population in this ecosystem suddenly decreased, which population would most likely increase?

- A. Hawk
- B. Mouse
- C. Grass
- D. Grasshopper

## Practice Test 1: Answers and Explanations

### Reasoning Through Language Arts

**Question 1: Multiple-Choice**

Correct Answer: B. Automation poses challenges but also creates opportunities for those with the right skills.

Explanation: The passage presents a balanced view of automation, acknowledging both risks and opportunities. While stating that "nearly 47% of all U.S. jobs could be at risk of automation," the author also notes that "this technological revolution is also creating new opportunities" and that "historical patterns suggest that technological advancement ultimately creates more jobs than it eliminates." The passage emphasizes adaptation rather than portraying automation as entirely negative or positive, making option B the most accurate summary of the author's view.

**Question 2: Multiple-Choice**

Correct Answer: C. "Jobs requiring creativity, emotional intelligence, and complex problem-solving—skills that machines cannot easily replicate—are expanding."

Explanation: This sentence directly addresses which human abilities will remain valuable despite automation. It identifies specific skills (creativity, emotional intelligence, and complex problem-solving) that machines cannot easily replicate and states that jobs requiring these skills are expanding. The other options do not directly address which human abilities will remain valuable in an automated workplace.

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### **Question 3: Drop-Down**

Correct Answer: environment or situation

Explanation: In the context of "workers must adapt to this changing landscape," the word "landscape" is being used metaphorically to describe the general employment environment or work situation, not literal scenery or geography. The author is discussing how the workplace and job market are changing, making "environment or situation" the correct interpretation of the word in this context.

### **Question 4: Drop-Down**

Correct Answer: decreased except at the beginning and end

Explanation: The passage states: "as the rats learned to navigate the maze, their mental activity decreased" and later specifies that "only the beginning and end of the maze triggered significant mental action." This clearly indicates that brain activity decreased throughout most of the maze except at the beginning and end, making this the correct option.

### **Question 5: Drag and Drop**

Correct Order:

1. Cue
2. Routine
3. Reward

Explanation: The passage explicitly outlines the habit loop in this sequence: "First, there is a cue, a trigger that tells your brain to go into automatic mode. Then there is the routine, which can be physical, mental, or emotional. Finally, there is a reward, which helps your brain determine if this particular loop is worth remembering."

### **Question 6: Fill in the Blank**

Correct Answer: extinguish; change

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Explanation: The passage states: "The golden rule of habit change is that you cannot extinguish a bad habit; you can only change it by substituting a new routine while keeping the same cue and reward." The words "extinguish" and "change" are taken directly from this sentence.

### **Question 7: Multiple-Choice**

Correct Answer: C. To defend her action by claiming that women already have the constitutional right to vote

Explanation: Anthony is not apologizing (A) but defending her actions. She's not arguing for future rights (B) but claiming women already have these rights. She's not encouraging illegal protest (D) but arguing that her vote was already legal under the Constitution. Her main purpose is to defend her action by arguing that the Constitution already grants women the right to vote as evidenced by her statement that she "simply exercised my citizen's rights, guaranteed to me and all United States citizens by the National Constitution."

### **Question 8: Fill in the Blank**

Correct Answer: the Preamble

Explanation: In the passage, Susan B. Anthony specifically quotes the Preamble of the Constitution, which begins with "We, the people of the United States..." She uses this to argue that "the whole people" (including women) formed the Union and have constitutional rights.

### **Question 9: Drag and Drop**

Correct Answers:

According to Susan B. Anthony:

1. The Constitution was established by all people, including women
2. The Constitution was designed to secure existing liberties

Contrary to Susan B. Anthony's view:

1. Women were explicitly excluded from voting by the Constitution
  2. Women should be given new rights not found in the Constitution
-

Explanation: Anthony argues that "we, the whole people" (including women) formed the Union, and that the Constitution was meant to "secure" liberties (not give new ones). She would disagree with the statements that women were explicitly excluded by the Constitution or that women need new rights not already guaranteed by the Constitution.

### **Question 10: Extended Response**

Scoring Guidelines:

*A strong response would:*

- Compare how both texts invoke founding principles (Declaration of Independence language)
- Analyze how Anthony focuses on constitutional interpretation while the Declaration of Sentiments emphasizes historical injustices
- Evaluate the effectiveness of direct legal argument (Anthony) versus moral appeal (Declaration)
- Support analysis with specific quotes and references from both texts
- Consider the different contexts and audiences for each text
- Demonstrate clear organization, proper grammar, and appropriate academic language
- Provide a thoughtful conclusion about the relative effectiveness of each approach

The extended response requires students to analyze both texts, compare rhetorical strategies, and evaluate effectiveness, supporting their arguments with specific evidence from the passages.

## **Mathematical Reasoning**

### **Question 1: Multiple-Choice**

Correct Answer: B. 1

Explanation: To find the value of  $y$ , substitute  $x = 3$  into the equation  $y = 2x - 5$ .

$$y = 2(3) - 5$$

$$y = 6 - 5$$

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$$y = 1$$

**Question 2: Multiple-Choice**

Correct Answer: A.  $x = -3$

Explanation:

Start with the equation:  $2(x - 3) + 4 = 3x + 1$

Distribute the 2:  $2x - 6 + 4 = 3x + 1$

Combine like terms:  $2x - 2 = 3x + 1$

Subtract  $3x$  from both sides:  $-x - 2 = 1$

Subtract 1 from both sides:  $-x - 3 = 0$

Multiply both sides by  $-1$ :  $x + 3 = 0$

Subtract 3 from both sides:  $x = -3$

**Question 3: Fill in the Blank**

Correct Answer: \$40.50

Explanation: To find the average (mean) price of the sweater, add all the prices and divide by the number of stores.

$$(\$45.00 + \$36.00 + \$42.00 + \$39.00) \div 4$$

$$= \$162.00 \div 4$$

$$= \$40.50$$

**Question 4: Multiple-Choice**

Correct Answer: B.  $2x^2 - 5x + 9$

Explanation: To subtract one polynomial from another, distribute the negative sign to each term in the second polynomial, then combine like terms.

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$$\begin{aligned}(3x^2 - 2x + 4) - (x^2 + 3x - 5) \\ &= 3x^2 - 2x + 4 - x^2 - 3x + 5 \\ &= 3x^2 - x^2 - 2x - 3x + 4 + 5 \\ &= 2x^2 - 5x + 9\end{aligned}$$

**Question 5: Multiple-Choice**

Correct Answer: B. 228 miles

Explanation: We can set up a proportion to solve this problem:

$$15 \text{ gallons} / 285 \text{ miles} = 12 \text{ gallons} / x \text{ miles}$$

Cross multiply:

$$15x = 12 \times 285$$

$$15x = 3,420$$

$$x = 3,420 \div 15$$

$$x = 228 \text{ miles}$$

**Question 6: Drop-Down**

Correct Answer: 68°F

Explanation: Using the formula  $F = (9/5)C + 32$ , substitute  $C = 20$ :

$$F = (9/5)(20) + 32$$

$$F = 36 + 32$$

$$F = 68^\circ\text{F}$$

**Question 7: Multiple-Choice**

Correct Answer: D. 192 cm<sup>3</sup>

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Explanation: The volume of a rectangular prism is calculated using the formula  $V = \text{length} \times \text{width} \times \text{height}$ .

$$V = 8 \text{ cm} \times 4 \text{ cm} \times 6 \text{ cm}$$

$$V = 192 \text{ cm}^3$$

### Question 8: Hot Spot

Correct Answer: Mark at position 1 on the number line (between 0 and 2)

Explanation: Calculate the value of  $2(-3) + 7$ :

$$2(-3) + 7 = -6 + 7 = 1$$

So you should mark the point at position 1 on the number line.

### Question 9: Multiple-Choice

Correct Answer: B. \$600

Explanation: According to the circle graph, 25% of Maria's expenses go to food.

$$\text{Amount spent on food} = 25\% \text{ of } \$2,400$$

$$= 0.25 \times \$2,400$$

$$= \$600$$

### Question 10: Drag and Drop

Correct Order:

1. 3.05

2. 3.051

3. 3.15

4. 3.5

Explanation: To compare decimal numbers, align the decimal points and compare digits from left to right:

- 3.05 and 3.051: Both start with 3.05, but 3.051 has an additional digit, making 3.05 smaller.
-

- 3.051 and 3.15: Comparing the first decimal place,  $0 < 1$ , so  $3.051 < 3.15$ .
- 3.15 and 3.5: Comparing the first decimal place,  $1 < 5$ , so  $3.15 < 3.5$ .

**Question 11: Fill in the Blank**

**Correct Answer: \$180**

Explanation:

Daily rental fee = \$45

Mileage fee = \$0.25 per mile

Total bill = (daily fee  $\times$  number of days) + (mileage fee  $\times$  number of miles)

$$= (\$45 \times 3) + (\$0.25 \times 180)$$

$$= \$135 + \$45$$

$$= \$180$$

**Question 12: Multiple-Choice**

Correct Answer: C.  $75^\circ$

Explanation: The sum of all angles in a triangle is  $180^\circ$ .

Given that two angles are  $45^\circ$  and  $60^\circ$ , the third angle is:

$$180^\circ - 45^\circ - 60^\circ = 75^\circ$$

**Question 13: Multiple-Choice**

Correct Answer: B. \$90

Explanation: If 3 shirts cost \$54, then 1 shirt costs  $\$54 \div 3 = \$18$ .

So 5 shirts would cost  $5 \times \$18 = \$90$ .

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**Question 14: Drop-Down**

Correct Answer: four times the original area

Explanation: The original square has a side length of 12 units, so its area is  $12^2 = 144$  square units.

If the side length is doubled to 24 units, the new area is  $24^2 = 576$  square units.

The ratio of the new area to the original area is  $576 \div 144 = 4$ .

Therefore, the new area is four times the original area.

**Question 15: Fill in the Blank**

Correct Answer: \$668.75

Explanation:

Amount from chocolate bars =  $125 \times \$2.50 = \$312.50$

Amount from popcorn =  $95 \times \$3.75 = \$356.25$

Total amount collected =  $\$312.50 + \$356.25 = \$668.75$

## **Social Studies**

**Question 1: Multiple-Choice**

Correct Answer: B. dangerous working conditions and long hours in factories

Explanation: According to the passage, the Industrial Revolution created "dangerous working environments" where "workers often labored 12-16 hours per day, six days per week" and "factory conditions were hazardous, with poor ventilation, few safety measures, and minimal breaks." The passage directly states that "in response to these conditions, workers began to organize," establishing a clear cause-and-effect relationship between poor working conditions and the formation of labor unions. The other options are not mentioned as factors that led to union formation in the passage.

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### **Question 2: Multiple-Choice**

Correct Answer: C. ending the employment of children in industrial settings

Explanation: The passage specifically mentions that the Knights of Labor advocated for "the end of child labor" as one of their goals. This directly corresponds to option C. The passage notes that "children as young as five years old worked in mills, mines, and factories," establishing why this was an important issue for early labor unions. None of the other options (private healthcare, eliminating machinery, or preventing immigration) are mentioned as goals of early labor unions in the passage.

### **Question 3: Drop-Down**

Correct Answer: equal pay for equal work regardless of gender or race

Explanation: The passage explicitly states that the Knights of Labor, the first major national labor union formed in 1869, advocated for "equal pay for equal work regardless of gender or race." This exact phrase matches one of the answer options. The other options (restricting immigration, government ownership of factories, and violent strikes) are not mentioned as positions of the Knights of Labor in the passage.

### **Question 4: Multiple-Choice**

Correct Answer: C. Cuban Missile Crisis

Explanation: The timeline shows that the Cuban Missile Crisis in 1962 represented the height of nuclear tension between the United States and Soviet Union. This event is visually emphasized on the timeline with a larger red circle and bold text, indicating its significance. Historically, this confrontation over Soviet nuclear missiles in Cuba brought the two superpowers closest to nuclear war. None of the other events on the timeline (formation of NATO, Berlin Wall construction, or Soviet-Afghan War) represented such an acute nuclear standoff between the superpowers.

### **Question 5: Multiple-Choice**

Correct Answer: B. preventing the spread of communism beyond existing communist states

Explanation: Containment was the primary U.S. foreign policy strategy during the Cold War, aimed at stopping the spread of communism to new countries rather than rolling it back where it already existed. This explains why the U.S. formed alliances like NATO (shown on the timeline in 1949) and intervened

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in conflicts like the Korean War (1950-1953). Option B accurately describes this strategy. The other options mischaracterize containment by suggesting direct attacks on communist governments (A), establishing diplomatic relations with all nations (C), or complete withdrawal from international conflicts (D).

### **Question 6: Hot Spot**

Correct Answer: [Mark on the timeline at 1949 - NATO Formed]

Explanation: NATO (North Atlantic Treaty Organization) was the formal military alliance created by Western nations to counter Soviet influence during the Cold War. On the timeline, this event appears in 1949, where students should place their mark. NATO represented the institutionalization of Western military cooperation against the perceived Soviet threat. The Warsaw Pact (1955) was the Soviet bloc's counterpart to NATO, formed in response to West Germany joining NATO.

### **Question 7: Multiple-Choice**

Correct Answer: B. Declaration of Independence

Explanation: The quoted text is the opening of the second paragraph of the Declaration of Independence, written in 1776. This document proclaimed the American colonies' separation from Great Britain and outlined the philosophical justification for this action. The passage contains the famous phrases about "unalienable Rights" including "Life, Liberty and the pursuit of Happiness" and discusses the right of the people to "alter or to abolish" a government that becomes "destructive" to securing these rights. These concepts are not found in the U.S. Constitution, Bill of Rights, or Federalist Papers.

### **Question 8: Multiple-Choice**

Correct Answer: C. Enlightenment liberalism

Explanation: The ideas expressed in the Declaration of Independence reflect Enlightenment liberalism, particularly the concepts of natural rights, government by consent of the governed, and the right to overthrow tyrannical governments. These ideas were advocated by Enlightenment philosophers like John Locke and Jean-Jacques Rousseau. Absolutism (option A) advocates for unlimited monarchical power, contradicting the passage's emphasis on the people's rights. Mercantilism (option B) is an economic theory unrelated to political rights. Socialism (option D) developed later and focuses on collective ownership rather than individual rights.

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### **Question 9: Fill in the Blank**

Correct Answer: Brown v. Board of Education

Explanation: Brown v. Board of Education was the landmark 1954 Supreme Court case that ruled racial segregation in public schools unconstitutional. This decision overturned the "separate but equal" doctrine established in the 1896 Plessy v. Ferguson case, which had allowed racial segregation in public facilities. The Brown decision was a crucial victory for the civil rights movement and helped establish the legal foundation for desegregation efforts nationwide.

### **Question 10: Multiple-Choice**

Correct Answer: D. 2020

Explanation: According to the voter turnout table, 2020 had the highest voter turnout percentage at 66.8%. This exceeds the turnout for all other years shown: 2000 (54.2%), 2004 (60.1%), 2008 (61.6%), 2012 (58.6%), and 2016 (60.1%). The 2020 presidential election between Joe Biden and Donald Trump saw the highest voter participation rate in over a century, due in part to expanded mail-in voting during the COVID-19 pandemic.

### **Question 11: Drag and Drop**

Correct Answer:

1. Civilian Conservation Corps (CCC) : Provided jobs for young men in conservation projects
2. Federal Deposit Insurance Corporation (FDIC) : Protected bank deposits against bank failures
3. Social Security Act : Provided economic security for elderly and unemployed
4. Tennessee Valley Authority (TVA) : Brought electricity and flood control to rural areas

Explanation: These matches correctly pair each New Deal program with its primary purpose. The Civilian Conservation Corps employed young men to work on environmental conservation projects. The Federal Deposit Insurance Corporation was created to restore confidence in the banking system by guaranteeing deposits. The Social Security Act established retirement benefits and unemployment insurance. The Tennessee Valley Authority was a regional development agency that built dams and power plants to control flooding and provide electricity to the rural Southeast.

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**Question 12: Multiple-Choice**

Correct Answer: C. Latin American immigration has increased the most since 1960

Explanation: The immigration graph shows that Latin American immigration (depicted in orange) experienced the greatest increase from 1960 to 2020 compared to other regions. While Asian immigration also increased significantly, the rise in Latin American immigration was more dramatic, particularly between 1980 and 2000. Option A is incorrect because European immigration declined rather than remained consistent. Option B is incorrect because Asian immigration increased (not decreased) since 2000. Option D is incorrect because while African immigration grew, it did not surpass European immigration by 2020.

**Question 13: Fill in the Blank**

Correct Answer: South

Explanation: The Great Migration was the movement of approximately 6 million African Americans from the rural South to industrial cities in the North and West between 1916 and 1970. This population shift was driven by African Americans seeking better economic opportunities and escape from Jim Crow segregation laws and racial violence in the South. This demographic movement significantly changed the cultural and political landscape of the United States.

**Question 14: Multiple-Choice**

Correct Answer: B. Louisiana Territory

Explanation: The Louisiana Territory was acquired through the 1803 purchase from France, commonly known as the Louisiana Purchase. On the map, this territory is shown in blue/purple in the central portion of the current United States. President Thomas Jefferson purchased this vast territory from Napoleon Bonaparte for \$15 million, nearly doubling the size of the United States. Florida (option A) was acquired from Spain in 1819. Texas (option C) was annexed in 1845 after being an independent republic. The Mexican Cession (option D) was obtained in 1848 following the Mexican-American War.

**Question 15: Multiple-Choice**

Correct Answer: B. Public and private schools together educate more than 70% of children

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Explanation: According to the pie chart, public schools account for 39.2% of children's education and private schools account for 31.5%. Combined, they educate 70.7% of children, making statement B correct. Option A is incorrect because private schools (31.5%) have a much higher percentage than home tutoring (13.8%). Option C is incorrect because the "Other" category (5.4%) represents the least common educational option, not cooperative education (10.1%). Option D is incorrect because public schools (39.2%) and private schools (31.5%) educate different percentages of children, not equal numbers.

## Science

### **Question 1: Multiple-Choice**

Correct Answer: C. Type of fertilizer

Explanation: The independent variable in an experiment is the factor that the scientist deliberately changes or manipulates. In this experiment, the scientist is testing the effectiveness of four different fertilizers (W, X, Y, and Z) while keeping all other conditions the same. The type of fertilizer is what's being varied between the groups, making it the independent variable. The height of the plants (option A) is the dependent variable—what's being measured to assess the effect of the independent variable. The amount of water and sunlight (options B and D) were kept constant across all groups in the experiment.

### **Question 2: Multiple-Choice**

Correct Answer: A. Plants with no fertilizer

Explanation: A control group provides a baseline for comparison in an experiment. It should be identical to the experimental groups except for the independent variable (fertilizer type). The best control group would be plants grown under identical conditions but without any fertilizer. This allows the scientist to determine if each fertilizer is effective compared to using no fertilizer at all. Options B, C, and D would all be different experimental groups, not controls, because they involve changing variables (fertilizer type, water amount, or light exposure).

### **Question 3: Multiple-Choice**

Correct Answer: C. Crystals can grow and become more complex.

Explanation Cell theory states that all living things are composed of cells, cells are the basic unit of life, and all cells come from pre-existing cells. While crystals can grow and become more complex, they are

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non-living structures that form through chemical processes, not biological ones. They don't contain cells and don't come from other cells. Options A, B, and D all describe cellular properties that support cell theory: bacteria dividing to form offspring supports that cells come from pre-existing cells; tissues made of cells supports that living things are composed of cells; and a one-celled organism carrying out life functions supports that cells are the basic unit of life.

#### **Question 4: Fill in the Blank**

Correct Answer: condensation

Explanation In the water cycle, condensation is the process by which water vapor in the air changes to liquid water. This occurs when warm air containing water vapor cools, causing the vapor to change state from a gas to a liquid. The diagram shows this process occurring as water vapor forms clouds. Condensation is the opposite of evaporation, which is the process shown in the diagram where liquid water changes to water vapor.

#### **Question 5: Multiple-Choice**

Correct Answer: C. Increased wind speed

Explanation: Evaporation occurs when liquid water changes to water vapor. The rate of evaporation increases when: (1) temperature increases, (2) humidity decreases, or (3) wind speed increases. Higher wind speeds remove the water vapor that accumulates just above the water's surface, allowing more water molecules to escape into the air. Option A (decreased air temperature) would actually slow evaporation. Option B (increased humidity) would also slow evaporation since the air would be closer to saturation. Option D (decreased sunlight) would reduce the energy available to drive evaporation.

#### **Question 6: Multiple-Choice**

Correct Answer: C. They have the same number of valence electrons.

Explanation Elements in the same group (column) of the periodic table have similar chemical properties because they have the same number of valence electrons (electrons in their outermost energy level). These valence electrons largely determine how an element will react with other elements. For example, all elements in Group 1 (alkali metals) have one valence electron, making them highly reactive. Having the same number of neutrons (option A) or atomic mass (option B) doesn't necessarily result in similar chemical behavior. The number of protons (option D) determines an element's identity, not its chemical behavior.

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### Question 7: Multiple-Choice

Correct Answer: B. Friction

Explanation: When a soccer ball rolls across a field and gradually slows to a stop, the primary force responsible is friction between the ball and the ground surface. This friction converts the ball's kinetic energy into heat and eventually brings the ball to rest, illustrating Newton's First Law—an object in motion will remain in motion unless acted upon by an unbalanced force. While gravity (option A) pulls the ball downward, it doesn't significantly slow the ball's horizontal motion. Air resistance (option C) contributes minimally for a rolling ball at low speeds. Magnetic force (option D) is not relevant as a soccer ball is not magnetic.

### Question 8: Multiple-Choice

Correct Answer: C. 75%

Explanation: In the Punnett square showing a cross between two heterozygous plants ( $Pp \times Pp$ ), there are four possible offspring genotypes: PP, Pp, pP, and pp. Since purple color is dominant (P), any offspring with at least one P allele will have purple flowers. Looking at the Punnett square, three out of the four possible combinations (PP, Pp, and pP) contain at least one dominant P allele, producing purple flowers. Therefore, the probability of offspring having purple flowers is  $3/4$  or 75%.

### Question 9: Multiple-Choice

Correct Answer: D. pp

Explanation: For a recessive trait like white flowers to appear, an organism must have two recessive alleles (pp). The dominant allele (P) masks the recessive allele when present. In this cross between two heterozygous plants ( $Pp \times Pp$ ), only one of the four possible offspring genotypes (pp) would result in white flowers. The other genotypes (PP, Pp, and pP) all contain at least one dominant P allele, which would result in purple flowers.

### Question 10: Drag and Drop

Correct Answer: 1. Kinetic energy, 2. Chemical energy, 3. Potential energy, 4. Electrical energy

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Explanation: Kinetic energy is the energy of motion, so a moving car has kinetic energy. Chemical energy is stored in the bonds between atoms and molecules and is released during chemical reactions; batteries store and release chemical energy. Potential energy is stored energy that an object has due to its position; a book on a high shelf has gravitational potential energy. Electrical energy is the energy of moving electrons; a household outlet provides electrical energy.

### **Question 11: Multiple-Choice**

Correct Answer: B. Algae → Fish → Seal → Polar bear

Explanation: This sequence correctly shows the energy flow from producer to tertiary consumer. Algae is a producer (organism that makes its own food through photosynthesis). Fish eat algae, making them primary consumers. Seals eat fish, making them secondary consumers. Polar bears eat seals, making them tertiary consumers. Option A is incorrect because bacteria are decomposers, not tertiary consumers. Option C doesn't show a complete chain (mountain lions aren't typically predators of hawks). Option D is incorrect because mushrooms are decomposers, not producers.

### **Question 12: Fill in the Blank**

Correct Answer: photosynthesis

Explanation: Photosynthesis is the process by which producers (mainly plants, algae, and some bacteria) convert light energy from the sun into chemical energy stored in glucose and other organic molecules. This process requires carbon dioxide, water, and sunlight, and it releases oxygen as a byproduct. Photosynthesis is the foundation of most ecosystems, as it creates the energy-rich organic compounds that fuel the entire food web.

### **Question 13: Multiple-Choice**

Correct Answer: C. Adenine pairs with thymine, and guanine pairs with cytosine.

Explanation: In DNA structure, specific nucleotide bases always pair together according to the base-pairing rules: adenine (A) pairs with thymine (T), and guanine (G) pairs with cytosine (C). Option A is incorrect because DNA is a double-stranded molecule, not single-stranded. Option B is incorrect because DNA contains the sugar deoxyribose, not ribose (which is found in RNA). Option D is incorrect because proteins are not building blocks of DNA; rather, DNA contains the instructions for building proteins.

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**Question 14: Multiple-Choice**

Correct Answer: D. Baking soda solution

Explanation: The pH scale ranges from 0 to 14, with 7 being neutral. Substances with a pH less than 7 are acidic, while substances with a pH greater than 7 are basic (alkaline). Baking soda (sodium bicarbonate) dissolves in water to form a basic solution with a pH around 8-9. Lemon juice (pH ~2), black coffee (pH ~5), and pure water (pH 7) all have pH values less than or equal to 7, making them either acidic or neutral, not basic.

**Question 15: Multiple-Choice**

Correct Answer: B. It will increase

Explanation: A solution with a pH of 2 is strongly acidic. When sodium hydroxide (NaOH), a strong base, is added to an acidic solution, it neutralizes the acid through the reaction:  $\text{H}^+ + \text{OH}^- \rightarrow \text{H}_2\text{O}$ . This neutralization reduces the concentration of hydrogen ions ( $\text{H}^+$ ), which increases the pH (makes it less acidic). If enough sodium hydroxide is added, the solution could become neutral (pH 7) or even basic (pH > 7).

**Question 16: Multiple-Choice**

Correct Answer: C. Mountain range

Explanation: At a convergent boundary where two continental plates collide, neither plate subducts (sinks beneath the other) because continental crust is less dense than oceanic crust. Instead, the collision causes the crust to crumple and fold, forming mountain ranges like the Himalayas. Mid-ocean ridges (option A) form at divergent boundaries where plates move apart. Volcanic islands (option B) typically form at convergent boundaries where oceanic plates subduct. Rift valleys (option D) form at divergent boundaries where plates move apart.

**Question 17: Multiple-Choice**

Correct Answer: B. Double-blind study

Explanation: A double-blind study is an experimental design where neither the participants nor the researchers know who is receiving the actual treatment versus the placebo until after the study is

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completed. This design helps eliminate bias from both the participants and the researchers. The scenario describes a double-blind study because it specifically states that "neither the volunteers nor the researcher knows which participants received the real drug until after the study is completed."

**Question 18: Multiple-Choice**

Correct Answer: B. To establish a baseline for comparison

Explanation: The placebo (sugar pill) group serves as a control group in the experiment, establishing a baseline for comparison. This allows researchers to determine if any observed effects in the treatment group are due to the actual drug or to other factors, such as psychological effects (the placebo effect) or natural changes in the condition over time. Without a control group, it would be difficult to determine if the drug was truly effective. The placebo isn't used to save money (A), increase sample size (C), or test taste (D).

**Question 19: Multiple-Choice**

Correct Answer: C. An axe blade

Explanation: A wedge is a simple machine that converts a force applied to its blunt end into forces perpendicular to its inclined surfaces. It's essentially a portable inclined plane. An axe blade is a classic example of a wedge—the force applied to the handle is redirected to separate the wood along the blade edge. A screwdriver (option A) is primarily a wheel and axle. A seesaw (option B) is a lever. A doorknob (option D) is a wheel and axle.

**Question 20: Multiple-Choice**

Correct Answer: B. Mouse

Explanation: In the food web diagram, snakes prey on mice, helping to control the mouse population. If the snake population suddenly decreased, there would be less predation pressure on mice, likely resulting in an increase in the mouse population. The hawk population (option A) might decrease slightly since snakes are part of their food source, but hawks also eat mice, so the effect would be complex. The grass population (option C) might be indirectly affected through changes in the mouse population, but this would be a secondary effect. The grasshopper population (option D) is not directly connected to snakes in this food web.

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