# Passage 1: Data Representation

Researchers studied the effect of temperature on the growth of bacteria. They placed bacterial cultures in test tubes, exposed them to different temperatures (20°C, 30°C, and 40°C), and measured the bacterial population after 24 hours. The results are shown in Table 1 below:

### Temperature (°C) Bacterial Population (millions)

20 1.2

30 3.5

40 2.0

- 1. Based on Table 1, at which temperature was bacterial growth the highest?
  - A. 20°C
  - B. 30°C
  - C. 40°C
  - D. Growth was the same at all temperatures.
- 2. What was the difference in bacterial population between 20°C and 40°C?
  - A. 0.8 million
  - B. 1.3 million
  - C. 1.8 million
  - D. 2.3 million
- 3. If the experiment were conducted at 35°C, the bacterial population would most likely:
  - A. Be less than 1.2 million.
  - B. Be between 1.2 million and 3.5 million.
  - C. Equal 3.5 million.
  - D. Be greater than 3.5 million.
- 4. Which of the following conclusions can be drawn from the data in Table 1?
  - A. Bacteria grow best at lower temperatures.
  - B. Bacteria grow best at moderate temperatures.
  - C. Bacteria grow best at higher temperatures.
  - D. Temperature has no effect on bacterial growth.

# Passage 2: Research Summaries

Scientists tested two fertilizers (Fertilizer A and Fertilizer B) on plant growth. In Experiment 1, equal amounts of both fertilizers were applied to identical plants, and plant height was measured after 4 weeks. In Experiment 2, the scientists tested different concentrations of Fertilizer A. The results are shown in Figures 1 and 2.

Figure 1: Plant Height After 4 Weeks (Experiment 1)

- Fertilizer A: 12 cm
- Fertilizer B: 15 cm

Figure 2: Plant Height After 4 Weeks with Fertilizer A

#### Concentration (%) Plant Height (cm)

10 8

20 12

30 16

- 1. According to Figure 1, which fertilizer resulted in greater plant height?
  - A. Fertilizer A
  - B. Fertilizer B
  - C. Both had the same effect.
  - D. The data is insufficient to determine.
- 2. Based on Figure 2, what is the relationship between Fertilizer A concentration and plant height?
  - A. Increasing the concentration decreases plant height.
  - B. Increasing the concentration increases plant height.
  - C. Plant height is unaffected by Fertilizer A concentration.
  - D. Plant height is the same at all concentrations.
- 3. If the scientists used a 40% concentration of Fertilizer A, plant height would most likely be:
  - A. Less than 16 cm.
  - B. Equal to 16 cm.
  - C. Greater than 16 cm.
  - D. Impossible to predict.
- 4. Which experiment suggests that Fertilizer B is more effective than Fertilizer A?

- A. Experiment 1
- B. Experiment 2
- C. Both Experiment 1 and Experiment 2
- D. Neither Experiment 1 nor Experiment 2

## **Passage 3: Conflicting Viewpoints**

Two scientists disagree on the role of carbon dioxide (CO<sub>2</sub>) in climate change.

**Scientist 1**:  $CO_2$  emissions are the primary driver of global warming. Increased atmospheric  $CO_2$  traps heat, raising global temperatures. Reducing  $CO_2$  emissions is essential to slowing climate change.

**Scientist 2**: While CO<sub>2</sub> contributes to global warming, its role is overstated. Natural factors, such as solar activity and volcanic eruptions, have a greater impact on temperature fluctuations. Focusing solely on CO<sub>2</sub> emissions ignores other critical factors affecting climate.

- 1. According to Scientist 1, what is the most important action to slow climate change?
  - A. Increase volcanic activity.
  - B. Reduce solar activity.
  - C. Reduce  $CO_2$  emissions.
  - D. Study temperature fluctuations.
- 2. Scientist 2 argues that:
  - A.  $CO_2$  is the only cause of global warming.
  - B. CO<sub>2</sub> is not as significant as natural factors.
  - C. CO<sub>2</sub> emissions should be the primary focus of climate policy.
  - D. Climate change is not occurring.
- 3. Which statement would both scientists most likely agree on?
  - A. CO<sub>2</sub> has no role in global warming.
  - B. CO<sub>2</sub> contributes to global warming.
  - C. Solar activity is the main driver of climate change.
  - D. Human activity does not influence climate change.
- 4. Which viewpoint is supported by evidence linking CO<sub>2</sub> levels to temperature changes?
  - A. Scientist 1's viewpoint.
  - B. Scientist 2's viewpoint.
  - C. Neither viewpoint.
  - D. Both viewpoints.

# Passage 4: Data Representation

Researchers measured the effect of pH on enzyme activity. The enzyme was exposed to solutions with different pH levels, and the reaction rate was recorded. The results are shown in Figure 3.

Figure 3: Reaction Rate vs. pH

pН	Level	Reaction	Rate	(units/min)
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9 10

- 1. At which pH level was the enzyme activity highest?
  - A. 4
  - B. 6
  - C. 7
  - D. 8
- 2. Based on the data in Figure 3, what happens to the reaction rate as the pH level increases from 7 to 9?
  - A. It remains constant.
  - B. It increases.
  - C. It decreases.
  - D. It cannot be determined.
- 3. Which of the following best describes the relationship between pH and enzyme activity?
  - A. Enzyme activity is highest at an acidic pH.
  - B. Enzyme activity is highest at a neutral pH.

- C. Enzyme activity is unaffected by pH.
- D. Enzyme activity decreases as pH increases.
- 4. If the researchers tested a pH of 10, the reaction rate would most likely be:
  - A. Higher than 50 units/min.
  - B. Between 10 and 30 units/min.
  - C. Equal to 50 units/min.
  - D. Less than 10 units/min.

## Passage 5: Research Summaries

Scientists conducted experiments to test the effect of light intensity on plant growth. Experiment 1 exposed plants to low, medium, and high light intensities for 8 weeks. Experiment 2 tested different wavelengths of light on plant height. The results are shown below:

#### Table 1: Plant Growth vs. Light Intensity (Experiment 1)

Light Intensity	Plant	Height	(cm)
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Low 5

Medium 12

High 20

#### Table 2: Plant Height vs. Light Wavelength (Experiment 2)

Wavelength (nm) Plant Height (cm) 450 (Blue) 18

550 (Green) 10

650 (Red) 22

#### **Questions for Passage 5**

1. Based on Table 1, which light intensity resulted in the greatest plant height?

- A. Low
- B. Medium
- C. High
- D. All intensities were equal.
- 2. According to Table 2, which wavelength of light resulted in the shortest plant height?
  - A. Blue (450 nm)
  - B. Green (550 nm)
  - C. Red (650 nm)
  - D. Wavelength has no effect.
- 3. Which experiment tested the effect of light quality on plant growth?
  - A. Experiment 1
  - B. Experiment 2
  - C. Both Experiment 1 and Experiment 2
  - D. Neither Experiment 1 nor Experiment 2
- 4. If a plant were exposed to a wavelength of 600 nm, its height would most likely be:
  - A. Greater than 22 cm.
  - B. Between 10 cm and 22 cm.
  - C. Equal to 10 cm.
  - D. Impossible to predict.