

# dMAT General Academic Module

## Natural & Applied Sciences Practice Set

10 practice questions on interpreting scientific data, with a full answer key

**Format:** 10 questions, single-choice, four options each | Recommended time: 12 minutes | Choose the conclusion best supported by the data, not the one that assumes beyond it.

- Study the data before reading the answer choices.
- Choose the conclusion directly supported by the information given, and ignore options that assume more than the data shows.
- Answers and full explanations are on the last page.

### Question 1

A chemical reaction completes in 40 minutes at 20°C, 20 minutes at 30°C, and 10 minutes at 40°C. Which conclusion does the data best support?

- (a) Temperature has no effect on reaction time
- (b) Reaction time decreases as temperature increases
- (c) Reaction time increases as temperature increases
- (d) The reaction cannot occur below 20°C

### Question 2

A plant is grown with three fertiliser types over two weeks. Type A: 5 cm growth. Type B: 5 cm growth. Type C: 9 cm growth. Which conclusion is best supported?

- (a) Fertiliser type does not affect growth
- (b) Fertiliser C produced more growth than A or B
- (c) Fertiliser A is harmful to the plant
- (d) All three fertilisers produce identical results

### Question 3

Plant health is recorded at three soil pH levels. pH 5: poor health. pH 7: healthy. pH 9: poor health. Which conclusion is best supported?

- (a) Plants grow best in highly acidic soil
- (b) Plants grow best in highly alkaline soil
- (c) Plants grow best near a neutral pH
- (d) Soil pH has no effect on plant health

### Question 4

Light intensity is measured at increasing distances from a source. 1 m: 100 lux. 2 m: 25 lux. 4 m: 6 lux. Which conclusion is best supported?

- (a) Light intensity decreases sharply as distance increases
- (b) Light intensity increases with distance
- (c) Light intensity remains constant regardless of distance

- (d) Light intensity depends only on the light source's colour

### Question 5

Species count is recorded across three pollution levels. Low pollution: 40 species. Medium: 22 species. High: 8 species. Which conclusion is best supported?

- (a) Species diversity is unrelated to pollution
- (b) Species diversity decreases as pollution increases
- (c) Pollution has no measurable ecological effect
- (d) High pollution always eliminates all species

### Question 6

A metal rod measures 100 cm at 20°C and 100.12 cm at 60°C. Which conclusion is best supported?

- (a) The metal contracts when heated
- (b) The metal expands when heated
- (c) Temperature has no effect on the metal's length
- (d) The rod's material changes at high temperatures

### Question 7

An enzyme's activity is measured at different pH levels. Activity is highest at pH 7, and lower at both pH 4 and pH 10. Which conclusion is best supported?

- (a) The enzyme works equally well at any pH
- (b) The enzyme has an optimal pH range, with reduced activity outside it
- (c) Higher pH always increases enzyme activity
- (d) The enzyme is destroyed below pH 7

### Question 8

Crop yield is recorded across three rainfall levels. Low rainfall: 2 tons/hectare. Medium: 6 tons/hectare. High: 4 tons/hectare. Which conclusion is best supported?

- (a) Yield increases steadily as rainfall increases
- (b) Yield is highest at medium rainfall, and excess rainfall reduces it
- (c) Rainfall has no effect on crop yield
- (d) Low rainfall always produces the highest yield

### Question 9

Sound intensity is measured at increasing distances from a source. 1 m: 90 dB. 2 m: 84 dB. 4 m: 78 dB. Which conclusion is best supported?

- (a) Sound intensity increases with distance
- (b) Sound intensity decreases gradually as distance increases
- (c) Sound intensity is unaffected by distance
- (d) Sound intensity drops to zero beyond 4 m

### Question 10

Disease case counts are recorded at different vaccination rates. 20% vaccinated: 500 cases. 60% vaccinated: 120 cases. 90% vaccinated: 15 cases. Which conclusion is best supported?

- (a) Vaccination rate has no relationship with case counts
- (b) Higher vaccination rates correlate with fewer disease cases
- (c) Vaccination eliminates disease entirely once rates exceed 50%
- (d) Case counts depend only on the season, not vaccination

## Answer Key & Explanations

### Question 1 Answer: (b) Reaction time decreases as temperature increases

As temperature rises (20→30→40°C), reaction time falls (40→20→10 min). The data shows an inverse relationship, so reaction time decreases as temperature increases.

### Question 2 Answer: (b) Fertiliser C produced more growth than A or B

Type C produced 9 cm of growth versus 5 cm for A and B. The data directly supports that C outperformed the other two; it does not support any claim about why.

### Question 3 Answer: (c) Plants grow best near a neutral pH

Health is good only at pH 7, and poor at both pH 5 and pH 9. This pattern supports a preference for near-neutral pH, not a general acid or alkaline preference.

### Question 4 Answer: (a) Light intensity decreases sharply as distance increases

Intensity falls sharply and non-linearly with distance (100→25→6), supporting a sharp decrease, not a gradual or constant one.

### Question 5 Answer: (b) Species diversity decreases as pollution increases

Species count falls consistently as pollution rises (40→22→8), directly supporting a negative relationship between pollution and diversity.

### Question 6 Answer: (b) The metal expands when heated

The rod is longer at the higher temperature, directly supporting thermal expansion.

### Question 7 Answer: (b) The enzyme has an optimal pH range, with reduced activity outside it

Activity peaks at pH 7 and drops on both sides of it, which supports an optimal range rather than a simple 'higher is better' or 'destroyed below X' claim.

### Question 8 Answer: (b) Yield is highest at medium rainfall, and excess rainfall reduces it

Yield rises from low to medium rainfall, then falls at high rainfall, supporting a peak at medium levels rather than a steady increase.

### Question 9 Answer: (b) Sound intensity decreases gradually as distance increases

Intensity falls steadily but not to zero (90→84→78 dB), supporting a gradual decrease rather than a sudden drop-off.

### Question 10 Answer: (b) Higher vaccination rates correlate with fewer disease cases

As vaccination rate rises (20%→60%→90%), case counts fall sharply (500→120→15), directly supporting a correlation between higher vaccination and fewer cases.