ACT Science Quick Guide

Use this packet as a quick reference for the most important ACT Science tips and strategies.

Key Strategy #1: *Use your first 20 seconds on each passage to do a few key things:*

1. Distinguish graphs that look similar to one another, noting their figure numbers
2. Note whether graph axes run opposite the direction you're used to
3. Note whether any of the vertical axes refer to "percent"
4. Note whether there are keys and/or multiple curves on graphs
5. Identify how many experiments or studies there are

Be aware that there are multiple figures that look the same. Go to the right one!

Experiment 2

The conduction delay was determined for pure samples of PS1–PS4 at 100 °C. Each sample contained 1 of 4 *antioxidants* at a concentration of 300 mg/kg (see Figure 2). Antioxidants inhibit the decomposition of styrene exposed to air.

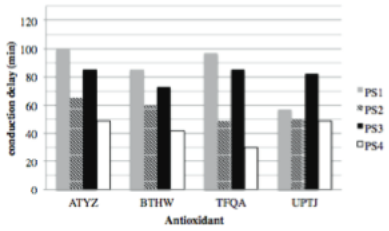


Figure 2

Experiment 3

The conduction delay was determined for pure samples of PS1–PS4 at 100 °C. Each sample contained a different concentration of the antioxidant ATYZ (see Figure 3).

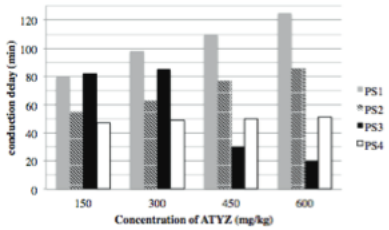


Figure 3

Know that there are keys in play, and watch your axes!

Key Strategy #4: *NEVER assume tables provide values in order – read the full table!*

Example

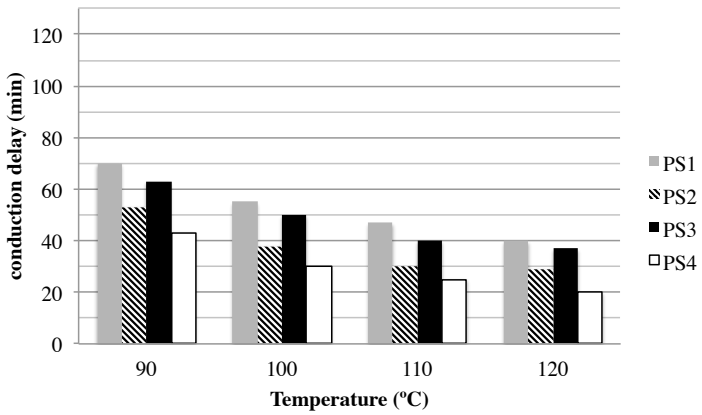
External Temperature (ºF)	Emissions (ppm)
110	25
120	65
130	78
140	94
150	43
160	58

According to the table, as external temperature increased, emissions concentration:

A. increased.
B. decreased.
C. increased, then decreased.
D. did not vary predictably.

NEVER assume that the pattern in the first few entries of a table will continue, unless you're asked to extrapolate beyond the data given (more on that later). If you take a quick look at all of the paired values of temperature and emissions in the table, you'll see that while the initial relationship appears to be direct (temperature and emissions both seem to increase together), this relationship breaks down at 150 °F, at which point the emissions drop, only to rise again at 160 °F. Therefore, there is no relationship, so Choice D is correct.

Key Strategy #5: *If you are asked about an unknown data point outside or within the range of given values, look to continue a consistent pattern to predict the value.*



Example

According to the figure, if the experimenters had observed the samples at a temperature of 105 ºC, the conduction delay of PS3 most likely would have been…

The trend in the graph shows the conduction delay of PS3 decreasing with increasing temperature; PS3's delay at 105 °C should thus be between its delays at 100 °C and 110 °C.

Key Strategy #6: *Use the phrasing in the answer choices to direct yourself to the relevant information, especially if you don't know where to start. Try to eliminate answers based on plainly false assertions.*

Example

In wastewater treatment procedures, *effluent* is defined as the outflow of treated sewage into a natural body of water, such as a stream. The amount of effluent per unit of natural flowing water is known as the *effluent of stream ratio*, or EOSR. Though the effluent is treated, a higher EOSR correlates with a higher concentration of bacteria in the stream. Scientists performed an experiment to measure the EOSR for each of four streams receiving treated discharge from sewage plants located in the geographical region.

Stream	EOSR
A	0.594
B	0.258
C	0.773
D	0.638

Table 1

Suppose the scientists had determined the EOSR for a fifth stream, designated as Stream E, to be 0.494. According to Table 1 and the information provided, compared to the concentration of bacteria in Stream B, the concentration of bacteria in Stream E is likely to be:

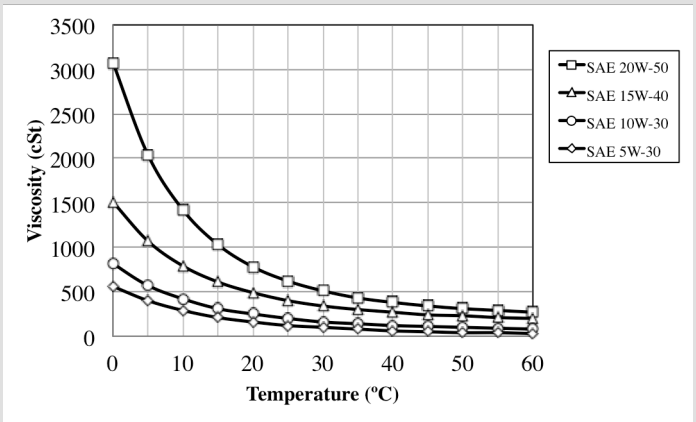
A. higher, because the EOSR of Stream E is higher than the EOSR of Stream B.
B. higher, because the EOSR of Stream E is lower than the EOSR of Stream B.
C. lower, because the EOSR of Stream E is higher than the EOSR of Stream B.
D. lower, because the EOSR of Stream E is lower than the EOSR of Stream B.

There's a lot of information here, but notice that the answer choices refer to the EOSR. We can actually eliminate choices B and D immediately, because they falsely state that the EOSR of Stream E is lower than that of Stream B (compare the value of Stream E's EOSR given in the question to Stream B's EOSR given in the table). Also, since the answers all focus on EOSR, this must mean that there is some relationship between EOSR and bacterial concentration. While this isn't revealed in the table, it is revealed in the text above the table, which states that "a higher EOSR correlates with a higher concentration of bacteria in the stream". This means that Stream E, which has the higher EOSR, will also have the higher concentration of bacteria. Thus Choice A is correct.

Key Strategy #7: *When a question references two data sources, find the "bridge" between the two and use both!*

Example

Oil Sample	Δ_η
SAE 20W-50	0.00990
SAE 15W-40	0.02174
SAE 10W-30	0.03846
SAE 5W-30	0.05263



A new oil sample is tested and is found to have a Δ_η of approximately 0.08. According to the table and the graph, as temperature increases, the new oil sample's viscosity would be expected to decrease:

A. more quickly than any of the other sample's viscosities.
B. more slowly than any of the other sample's viscosities.
C. more quickly than the viscosities of SAE 5W-30 and 10W-30, but more slowly than the viscosities of SAE 15W-40 and SAE 20W-50.
D. there is not enough information to determine the rate of the new sample's change in viscosity.

The question tells us to refer to the table and the graph for good reason: using the table, we must compare the Δ_η of the new sample to that of the samples already tested, and then use the graph to determine the relationship between the Δ_η of a sample and its viscosity's rate of decrease with increasing temperature. We can see that the value of the Δ_η for the new sample is higher than any of the others given. How does this relate to the graph? By using the key to pair each viscosity curve with its oil's value of Δ_η, we can see that the higher the value of Δ_η, the *more slowly* the viscosity decreases with increasing temperature (you can tell as much by the decreasing steepness of each curve as the value of Δ_η increases). This is the "bridge" between the table and the figure. Thus Choice B is correct.