1. Interpreting and Evaluating Experimental Results is an 8-10 point question that presents students with an authentic scenario accompanied by data in a table and/or graph. You will have 25 minutes to complete this question.

- Part A (1 to 2 points): **Describe** and **explain** biological concepts, processes, or models.

Describe: Provide relevant characteristics of a specified topic

DO	DO NOT
1) Make a claim 2) Take a specific and decisive stance 3) Let the claim speak for itself	1) List pieces of information 2) Take a vague and non-committed stance 3) Provide reasoning for your claim

Explain: Provide information about how or why a relationship, process, pattern, position, situation, or outcome occurs, using evidence and/or reasoning to support or qualify a claim. Explain "how" typically requires analyzing the relationship, process, pattern, position, situation, or outcome; whereas explain "why" typically requires analysis of motivations or reasons for the relationship, process, pattern, position, situation, or outcome.

DO	DO NOT
1) Provide reasoning for the claim imbedded in the question 2) Assume the reader has relevant background biology knowledge that needs not explaining 3) Keep your explanation specific to what is being asked (relevancy, correctness)	1) Provide reasoning for phenomena not directly linked to the question 2) Assume the reader can connect the dots themselves (let them ask "so what?") 3) Include excess information in the explanation that may or may not be relevant or correct

- Part B (3 to 4 points): **Identify** and **justify** experimental design procedures.

Identify: Indicate or provide information about a specified topic, without elaboration or explanation.

DO	DO NOT
1) Make a specific and decisive identification	1) Make a vague and non-specific identification 2) Provide reasoning for the identification you make

Justify: Provide evidence to support, qualify, or defend a claim, and/or provide reasoning to explain how that evidence supports or qualifies the claim.

DO	DO NOT
1) Provide evidence for the claim at hand (imbedded in the question) 2) Assume the reader has relevant background biology knowledge 3) Keep your justification specific to what is being asked (relevancy, correctness)	1) Provide evidence for claims not directly linked to the question 2) Assume the reader can connect the dots themselves (let them ask "so what?") 3) Include excess information in the justification that may or may not be relevant or correct

- Part C (1 to 3 points): **Analyze** data.

For all analysis tasks, it is essential that you are including the appropriate units in your responses

Analysis Task	Notes
Identify specific data points from a data table.	• Read the labels on the boxes without numbers to determine the variables and to learn more about the experiment itself • Simple vertical table: left column = independent variable data; right column = dependent variable data • Simple horizontal table: top row = independent variable data; bottom row = dependent variable data
Identify specific data points from a graph.	• Read the labels on the x and y axis to determine the variables and to learn more about the experiment itself • The x-axis USUALLY contains incremented values or categories for the independent variable (tested and/or manipulated) • The y-axis USUALLY contains incremented values for the dependent variable (measured)
Describe the trends and patterns in the data.	• **DO** use the terms increased, decreased, or remained constant • **DO NOT** use the terms went up, went down, or stayed flat • Be as specific as possible when you are describing the trend or pattern you observe
Describe how the dependent variable changes in response to the independent variable.	• Independent variable – tested or manipulated; dependent variable – measured in the experiment • **DO** use the terms increased, decreased, or remained constant • **DO NOT** use the terms went up, went down, or stayed flat • Be as specific as possible when you are describing the change that occurred
Calculate the mean of a data set.	• Mean = average • Add all the values up and divide this sum by the total number of values (ex. (2+3+1)/3 = 2)
Calculate a rate of change	• Rate = how quickly a change occurred • If you are analyzing a line graph, this is rise over run • Rate = (change in the dependent variable value) / (change in the independent variable value)
Calculate a ratio.	• The numbers must be in the correct order (ex. there are 8 slices of pizza for every 1 pizza for an 8:1 ratio) • The numbers must be simplified (ex. there are 16 slices of pizza in 2 pizzas for an 8:1 ratio)
Calculate a percent change	• % change = (new value–original value)/(original value) x 100 • A positive % change implies an increasing value • A negative % change implies a decreasing value
Determine if there is overlap between the bars of two or more sample means.	• If error bars **ARE NOT** overlapping there **is** a statistically significant difference between the values, which means that with a certain degree of certainty it **can be determined** that the measured values are not the same • If error bars **ARE** overlapping there **is NOT** a statistically significant difference between the values, which means that with a certain degree of certainty it **cannot be determined** that the measured values are different

- Part D (2 to 4 points): **Make and justify predictions.**

Predict/Make a prediction: Predict the causes or effects of a change in, or disruption to, one or more components in a relationship, pattern, process, or system.

DO	DO NOT
1) Make a specific and decisive prediction	1) Make a vague and non-specific prediction 2) Provide justification for the prediction you make **in the same sentence**

Justify: Provide evidence to support, qualify, or defend a claim, and/or provide reasoning to explain how that evidence supports or qualifies the claim.

DO	DO NOT
1) Provide evidence for the prediction you made 2) Assume the reader has relevant background biology knowledge 3) Keep your justification specific to what is being asked (relevancy, correctness)	1) Provide evidence for a different prediction other than the one you made 2) Assume the reader can connect the dots themselves (let them ask "so what?") 3) Include excess information in the justification that may or may not be relevant or correct

2. Conceptual Analysis is a 4-point question that presents students with an authentic scenario describing a biological phenomenon with a disruption. You will have 15 minutes to complete this question.

You will be asked to **describe, explain, predict, and justify.** See the tables above for detailed information on the "do's and don'ts" of these different task verbs.