AP® BIOLOGY 2001 SCORING GUIDELINES

Savannah

Question 3

1. (a) 4 points possible

10

6

4

1 point for proper orientation of graph (independent variable on x-axis)

1 point for graph (all of the elements below must be present)

- Uniform spacing of units
- Correct labeling of axes
 - proper numbering (a minor error acceptable)
 - X-axis label: "Time"/ "Hour"/a.m., p.m. labels/a conversion to integers requires unit label as well
 - Y-axis: oxygen label and mg/L Unit

1 point for correct plot of data points

- No connecting line necessary
- No point if more than one data point is misplotted
- No point if there is a **solid** extrapolation line beyond the 6:00 a.m. data point to the origin **or** the 12 midnight data point

1 point for drawing the cloudy day prediction Line/Curve (all of the elements below must be present)

- Distinguish between the two curves with a legend or direct labeling of one curve
- Position completely under the bright-day curve (may touch toward the tails)
- There must be some curve to the line (no flat lines)

1 9. (b) 5 points possible

Photosynthesis: production of O₂ correlated with light changes (i.e., explains changes in shape of bright-day curve). The student must link photosynthesis to increase in light to increase in O₂ production. The student must use the term "photosynthesis" or an excellent replacement such as the chemical equation for the process.

1 point Respiration: consumption of O₂. Must link respiration to decrease in O₂. The student must use the term "respiration" or an excellent replacement such as the chemical equation for the process or the name of another appropriate process such as "decomposition."

1 point Description of the interaction of the above: photosynthetic rate changes while respiration rate remains relatively constant.

point Overcast prediction curve explanation

- Reduced light leads to decreased photosynthetic O₂ production, etc.
- No point given if there is no prediction line/curve on the graph.

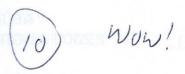
1 elaboration point (maximum) for any one of the above. Examples of elaboration may include, but are not limited to:

- Water split/photolysis to produce O₂ in the light phase, etc.
- Balanced equation for photosynthesis or respiration (unless used as a substitute for the term above)
- Description of "light phase" processes (photosystem II, etc.)
- Gross vs. net productivity

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Question 2: Gel Electrophoresis – Rubric



Part A (4 points max)

- Electrical Charge moves fragments
 - Negatively charged fragments move through gel toward anode (+) / DNA charge results from phosphate groups
 - Smaller fragments move faster (farther) relative to larger fragments
 - DNA fragments of known molecular weights used as markers

Part B (4 points max)

- Treatment I 4 bands 400, 1300, 1500, 1700 bp
- Treatment II 2 bands 900, 4000
 - Treatment III 5 bands 400, 500, 1200, 1300, 1500
 - Treatment IV 1 band 4900

Part C1 and C2 (4 points max)

C1

Recognition – binding of enzyme to target sequence/recognizes specific targets

- Cutting enzyme cuts at every target location
- Alternate cuts at a specific point
- Detail Point fragment lengths correspond to lengths between cutting sites/may generate blunt or sticky ends

C2

- Change in II Uncut/1 band (looks like IV)
- Change in III Like I: (4 bands)
- Alternate Y sequence is no longer recognized and cut
- Detail Point Describes that RFLPs (markers) might correlate with phenotypic variation
 - O Y site might become X site
 - o Deletion/insertion at Y site
 - Silent alteration in some target sequences