

# Predictive AP Biology Paper

## May 2025

### BIOLOGY

### SECTION II

Time — 1 hour and 30 minutes

6 Questions

**Directions:** Questions 1 and 2 are long free-response questions that require about 25 minutes each to answer. Questions 3 through 6 are short free-response questions that require about 10 minutes each to answer.

Read each question carefully and completely. Answers must be written out in paragraph form. Outlines, bulleted lists, or diagrams alone are not acceptable. You may plan your answers in this booklet, but no credit will be given for anything written in this booklet. You will **only earn credit for what you write in the separate Free Response booklet.**

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1. A researcher investigates the effect of different light wavelengths on the rate of photosynthesis in the aquatic plant *Elodea*. Small sprigs of *Elodea* were placed in test tubes containing a bicarbonate solution (source of CO<sub>2</sub>). Each tube was exposed to light of a specific wavelength for 30 minutes. The volume of oxygen gas produced was measured as an indicator of the photosynthetic rate. The experiment was conducted at a constant temperature of 25°C. The results are shown in Table 1.

**TABLE 1. OXYGEN PRODUCTION BY *ELODEA* UNDER DIFFERENT LIGHT WAVELENGTHS**

Light Wavelength (nm)	Average O <sub>2</sub> Produced (mL/30 min ± 2SE <sub>x</sub> )
400 (Violet)	4.5 ± 0.4
450 (Blue)	5.8 ± 0.5
500 (Blue-Green)	2.1 ± 0.3
550 (Green)	1.5 ± 0.2
600 (Orange)	3.9 ± 0.4
650 (Red)	6.1 ± 0.6
700 (Far Red)	0.8 ± 0.1

- (a) Describe the role of chlorophylls and carotenoids in capturing light energy during photosynthesis. Explain why the pattern of oxygen production shown in Table 1 is consistent with the properties of these pigments.