Counting Oxygen in a Model Plant Tank

Base your answers on the information provided and your knowledge of chemistry. Use the 2025 Chemistry Reference Tables as needed.

A class places equal lengths of the same aquatic plant in two model tanks. Over the same test period, the class collects gas bubbles and also measures the change in oxygen dissolved in the water. The table gives amounts of oxygen in millimoles. Its last column is a measured change, so the value can be positive or negative.

Tank	**Light level**	**O_2 collected as gas (mmol)**	**Change in dissolved O_2 (mmol)**
L	Low	0.10	+0.30
H	High	0.30	+0.05

1 Calculate the net increase of oxygen for each tank when both measured locations are included. Show your setup. [1]

Answer and work

2 Which conclusion follows from the measured oxygen amounts?

(1) H has both the greater gas collection and the greater net oxygen increase.

(2) H has the greater gas collection, while L has the greater net oxygen increase.

(3) L has both the greater gas collection and the greater net oxygen increase.

(4) The tanks have the same net oxygen increase.

The class notices that some gas remains above the water inside each sealed tank and never reaches the collector. A follow-up measurement finds that this space gained 0.02 mmol O_2 in L and 0.12 mmol O_2 in H. In the model no oxygen passes between either tank and the room.

3 Include the oxygen left above the water in each tank. Does the new evidence change which tank had the greater measured net oxygen increase? Support your answer with both totals. [1]

Answer and work

4 A student calls each revised total the amount of oxygen produced by photosynthesis. Explain why even the revised totals measure a net change. [1]

Answer and work