Checking a Color Change After Water Loss

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

A classroom model tracks a dissolved coloring agent. A sample initially absorbs strongly at 520 nm. After water evaporates, its color looks darker. The class restores the lost water to the original volume and compares that sample with a second one that received a light treatment.

Sample	**Volume when tested (mL)**	**Wavelengths with strong absorption (nm)**
Original	50	520
Evaporated, then restored	50	520
Light treated, then restored	50	445 and 520

1 Which result gives evidence beyond a simple change in concentration of the original coloring agent?

(1) The initial sample is 50 mL.

(2) The evaporated and restored sample absorbs at 520 nm.

(3) The restored light-treated sample has a strong band at 445 nm.

(4) All samples are measured at the same final volume.

2 Explain how restoring the evaporated sample to 50 mL helps test whether its darkening was due to water loss. [1]

Answer and work

A student suggests that the empty cell or water might also give a reading at 445 nm.

3 Describe a blank measurement that could check the student's suggestion. [1]

Answer and work

4 If the blank has no 445 nm band, what does that tell you about the light-treated result? Explain why an additional chemical test would still be useful. [1]

Answer and work