Calibrating Two Colors in a Model Light Meter

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

A class compares two colors in a model light meter. A reading of power describes how much light energy arrives per second. The meter's signal depends on the color. In the supplied range, doubling power doubles the signal for that color.

Single-color standard	Known power (mW)	Meter signal (units)
Blue	1.0	8
Red	1.0	4

1 What does the standard test show?

(1) The meter gives the same signal for equal powers of blue and red.

(2) The meter gives a larger blue signal even when the powers match.

(3) The red standard supplies twice the power of the blue standard.

(4) The meter responds only to blue.

The class tests a beam containing both colors. A filter that lets only blue pass gives 8 units. A filter that lets only red pass also gives 8 units. In the model each filter passes all of its selected color.

2 Use the standards to estimate the power of each color in the mixed beam. [1]

Answer and work

3 Explain why the two equal filtered signals do not show that the colors deliver equal power. [1]

Answer and work

4 Describe a check using a single-color standard to find out whether the red filter passes some blue light. [1]

Answer and work