Finding Dye Carryover in a Print Studio

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

A print studio class models how a dissolved blue dye carries over into rinsewater. It uses the same lamp, cell, and dye for all tests. In this model the meter's absorbance is proportional to dye concentration over the range shown. The class first measures solutions with known concentrations.

Dye concentration (mg/L)	**Absorbance**
0.0	0.00
2.0	0.12
4.0	0.24
6.0	0.36

1 A clear rinse sample gives an absorbance of 0.30. Use the standards to determine its dye concentration. Show how you used the data. [1]

Answer and work

A second sample contains visible specks as well as the same dissolved dye. After the class passes this sample through a screen, the specks are gone. It dilutes 10.0 mL of the clear screened sample with pure water to make 20.0 mL. The diluted sample reads 0.18.

2 What was the dye concentration of the screened sample before it was diluted?

(1) 1.5 mg/L

(2) 3.0 mg/L

(3) 6.0 mg/L

(4) 12.0 mg/L

3 A student claims that because the specks are gone, the screen also removed all dissolved dye. Evaluate that claim using the meter data. [1]

Answer and work

4 The class wants to test whether the screen itself changes the concentration of dissolved dye. Explain why comparing the two rinse samples cannot isolate that effect. Propose a matched test using clear dye solution. [1]

Answer and work