**AP Chemistry Daily Videos**

[**3.13 Beer-Lambert Law**](https://unit-resources-apclassroom.s3.amazonaws.com/Chemistry/Unit_Guides/Chemistry_Unit3.pdf?Signature=3S4V7SjRWHxTmch0ghZ29gLwceQ%3D&Expires=1604974289&AWSAccessKeyId=ASIAXUCCNI2WTQ4KHXII&x-amz-security-token=IQoJb3JpZ2luX2VjEPr//////////wEaCXVzLWVhc3QtMSJIMEYCIQDdaIdbzbURvw6FdQwiyNvDxToRmhRCCn4fwaPRdW9agQIhAO40xpv84epjCOcFmAXOQqRqxwe7ISMTakBXJNLMqdeLKrQDCGIQABoMNTI0MTI1MjkyMjA1IgyQTBSJYNuoEeAFMZkqkQNTDiyzeo/Bj582HhK2D2sAzF7j04X/hsx6Fc2rX9EePln0LScUinAeKQ7Uybg3%2BIP3BEx%2BGiyy9aL4PNgj7%2B7t%2BTIhJ5Gdd2/QjWk/Ro6Q13ixmZV8NdzeTYhCGOb6sqxRrBRSq3rNcX0MorIVZtuIKGCQ6m9Vt1jF0NOXKTkd5DhYSgt9WgBDlWUioaT9V6c31dyCL4ZlF18x8u9w9lXSGyhlIsoE7wD5gJWGsxY88hvyjsfUYp6O8%2BQ46lgE4bs8oUycYYyioXiDz238HEUUd59Wk3Sbpek/isjbC5FnbJWElGfWh%2BPYVoyRBHBMxcvgjrzW9KkKMkd8UAiZYTt8Z21XJ%2BDxc2W502IR8q3hvyjw/4SI4RmTMWm0NmkILzWiQZFJc1581esIFQwrNMDbsqY/hB3uHSrQDbMY1%2BHoph4A1DvQKSRHfydpD59gj/89KKEqY4sHRVZzZ1QvTq8dwGR4RsQJ9/aENj8mjVwC90BGXuxb2oe1WG%2BX4VXjOeDS1OlJZDaIw%2B06L5%2Bo3pojgjCc8qX9BTrqAUYByCYpwUNhlhtNu5LAMvox4ecKCkNQ9xVh2/9rYKk/i58VOcqz30RdO6no%2B0JU8pqnZjWJ8fKXJBT389uwompTlfgYcIEAhggr552Qoyd3dzau4neb9TKvjbqOUW1%2B7F2beOOxYeibTXYHq3o71zHGg155k1vf6Ixbuhrvof3bhlHo8pe8TjTzQNnuSmuGrkL%2B9Fc2mDmZgJGkHD8rznCu6abIajYWTzw3kX8kcv6qW4D/DRZ/OmXOPvUtQxJ3rHM%2BKq7doMlSSnOtcnmY3jfEo6e3WesKDXZUPa1USuiQKv%2Bn4Vwawq%2BnHw%3D%3D#T3.13)

[**Daily Video #1**](https://apclassroom.collegeboard.org/7/home?apd=9k5o1apgma)

**Spectroscopy and the Beer-Lambert Law**



Light is either absorbed or reflected by a substance.

The light that we see is light \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by the substance.

**Beer-Lambert Law:**

Instruments such as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ can be used to determine the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a chemical species (molecules or ions). 

* These instruments compare the amount of light that’s passing through a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the amount that can pass through a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .
* The beam of light at certain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ passes through the solution to a measuring device, which then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and compares it to a standard.

**The Beer-Lambert Law:**

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1. The cuvette into which the 0.600 M solution was placed had some water droplets inside
2. The cuvette into which the 0.600 M solution was placed was filled slightly more than the other cuvettes.
3. The wavelength setting was accidentally moved away from that of maximum absorbance
4. The cuvette used for the 0.600 M solution had not been wiped clean before being put in the spectrophotometer.

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**Daily Video #2**

**Beer-Lambert Law Simulation**

The Beer-Lambert law relates the absorption of light by a solution to three variables according to the equation:

**A=ɛbc**

**A = absorbance measurement**

**Ɛ = molar absorptivity (describes how intensely a sample absorbs light of a specific wavelength)**

**b = path length (the size of the cuvette)**

**c = concentration**

Go to the **Beer’s Law Lab 1.4.20** <https://phet.colorado.edu/sims/html/beers-law-lab/latest/beers-law-lab_en.html>

Using the PhET Simulation:

**Click on the Co(NO3)2 solution.**

1. What is the preset wavelength and why do you think that is?

*Set the wavelength to 491 nm.*

1. What do you notice as you increase and decrease the concentration of the solution?

**Click on the CuSO4 solution.**

1. What is the preset wavelength and why do you think that is?

*Set the wavelength to 712 nm.*

1. What do you notice as you increase and decrease the concentration of the solution?
2. Explain absorbance data that you observed for both solutions at 700 nm.

**Free - Response Question:**

A student has 100. mL of 0.400 M CuSO4 (aq) and is asked to make 100. mL of 0.150 M CuSO4 (aq) for a spectrophotometry experiment. The following laboratory equipment is available for preparing the solution: centigram balance, weighing paper, funnel, 10 mL beaker, 150 mL beaker, 50 mL graduated cylinder, 100 mL volumetric flask, 50 mL buret, and distilled water.

1. Calculate the volume of 0.400 M CuSO4 required for the preparation of the solution.
2. Briefly describe the essential steps to most accurately prepare the 0.150 M CuSO4 (aq) from the 0.400 M CuSO4 (aq) using the equipment listed above.