**Light – Atomic spectra**

**Connections to the Common Core Standards in Mathematics**

Novice:

[CCSS.MATH.CONTENT.6.EE.B.6](http://www.corestandards.org/Math/Content/6/EE/B/6/)
Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

Intermediate:

[CCSS.MATH.CONTENT.6.RP.A.1](http://www.corestandards.org/Math/Content/6/RP/A/1/)
Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.

[CCSS.MATH.CONTENT.7.RP.A.2](http://www.corestandards.org/Math/Content/7/RP/A/2/)
Recognize and represent proportional relationships between quantities.

[CCSS.MATH.CONTENT.8.EE.B.6](http://www.corestandards.org/Math/Content/8/EE/B/6/)
Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation *y* = *mx* + *b* for a line intercepting the vertical axis at*b*.

Expert:

[CCSS.MATH.CONTENT.HSN.Q.A.1](http://www.corestandards.org/Math/Content/HSN/Q/A/1/)
Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

[CCSS.MATH.CONTENT.HSN.Q.A.2](http://www.corestandards.org/Math/Content/HSN/Q/A/2/)
Define appropriate quantities for the purpose of descriptive modeling.

[CCSS.MATH.CONTENT.HSN.Q.A.3](http://www.corestandards.org/Math/Content/HSN/Q/A/3/)
Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

#### [CCSS.MATH.PRACTICE.MP2](http://www.corestandards.org/Math/Practice/MP2/) Reason abstractly and quantitatively.

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to *contextualize*, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

#### [CCSS.MATH.PRACTICE.MP4](http://www.corestandards.org/Math/Practice/MP4/) Model with mathematics.

Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.