

Implementation Template

Teacher name(s):

Abe Phelps

Activity title or description of what will be implemented:

X-Ray Diffraction, Rosalind Franklin, and DNA

[Student Link](#)

[Teacher Link](#)

Class(es) in which used:

I plan to use this as an activity in my intro-physics class (9th/10th grade) with some modifications.

Grade Level(s):

9-10

Connected curriculum topic(s) or practice(s):

HS-PS4-3. Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described by either a wave model or a particle model, and that for some situations involving resonance, interference, diffraction, refraction, or the photoelectric effect, one model is more useful than the other.

Clarification Statement: Emphasis is on qualitative reasoning and comparisons of the two models. State Assessment Boundary: Calculations of energy levels or resonant frequencies are not expected in state assessment.

HS-PS4-5. Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.*

Clarification Statements: Emphasis is on qualitative information and descriptions. Examples of technological devices could include solar cells capturing light and converting it to electricity, medical imaging, and communications technology. Examples of principles of wave behavior include resonance, photoelectric effect, and constructive and destructive interference. State Assessment Boundary: Band theory is not expected in state assessment.

Reason(s) for choosing:

This seems to be a good way to link connections between how knowledge of physics has influenced our understanding of life sciences. Likewise, it is a good way to bring up a discussion of the role of women in science.

Expected challenges or pitfalls, and ideas for overcoming these challenges:

Measuring and calculating these values at an introductory level may pose some challenges (i.e. some simplifications may be needed)

Other comments:

I'm thinking of adapting this to use several different colored lasers, in order to see variations in diffraction patterns.