

# Science and AP Physics Curriculum

Kate McDonnell  
Highland High School  
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# Highland High School

- Ault, CO
- Grades 9-12
- Student population of 270



# HHS Science

- Freshman year – Science 9
  - Sophomore year – Biology
  - Junior and Senior years – Pick at least one of:
    - Everyday Science
    - Chemistry
    - Advanced Biology
    - Advanced Placement Physics
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# Science 9 / ICPE

- Scientific Method
    - Graphing
    - Variables
    - Error and controls
  - Physics
    - Motion
    - Energy
    - Light
  - Astronomy
  - Chemistry
    - Atoms, Periodic Table
    - Chemical Bonding
    - Chemical Reactions
    - Properties of materials and separation
    - Sludge Test
  - Earth Science
  - Meteorology
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# Labs

- Mythbusters Project
  - Density Canisters - make a canister that floats in water, sits suspended, and sinks.
  - What factors affect the period of a pendulum?
  - Which makes a better insulator – air, water, or Styrofoam?
  - Identify ionic and covalent compounds.
  - Identify physical and chemical changes.
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# Sludge Test

- Lab practical
  - Students are completely self-driven, teacher doesn't answer questions
  - Students do labs for four weeks to prepare for the test by learning separation techniques
  - Students have two weeks to separate ten substances from their test tube
  - Lab and report is 10% of their semester grade
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# AP Physics Topics

- Review of Algebra skills
  - Simple Motion
  - Forces
  - Vectors
  - Circular Motion
  - Gravitational Motion
  - Momentum and Energy
  - Thermodynamics
  - Fluids
  - Waves and Sound
  - Geometric Optics
  - Electricity
  - Magnetism
  - Modern Physics
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# AP Physics Challenges

- How do you cover that much in one year?
  - What is the balance between concepts and math?
  - How do you motivate apathetic students to push themselves?
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# Inquiry Labs

- AP requires 12 labs, and they should be inquiry-based...
  - Students are given an objective or a question and list of materials, and they must develop their own procedure
  - Examples:
    - How high is the flag pole?
    - What is the coefficient of friction of wood, etc?
    - Where will a ball bearing land?
    - Determine the contents of a “black box” using a voltmeter and ammeter.
    - Construct a one-tube or one-string instrument.
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# Lab Format

- Wanted to shorten time spent writing lab reports, while making students really think about what they experienced
  - Focus on why we do the lab and how it can be used in their own life
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Writing Style \_\_\_\_ / 5  
Pre-Lab \_\_\_\_ / 5  
Data & Graphs \_\_\_\_ / 5  
Conclusion \_\_\_\_ / 5  
Questions \_\_\_\_ / 5  
Total \_\_\_\_ / 25

Name: \_\_\_\_\_

Period: \_\_\_\_\_

Date: \_\_\_\_\_

Lab Title: \_\_\_\_\_

### Pre-Lab

Purpose: \_\_\_\_\_ Copy the purpose of the

Background Information: \_\_\_\_\_ W

Procedure: \_\_\_\_\_ Write down the steps you will follow in the lab.

Picture of Setup: \_\_\_\_\_

Materials: \_\_\_\_\_ List the materials required for the lab.

Variables  
& Equations: \_\_\_\_\_

### Conclusion

What did you learn in this lab?

Did your work successfully meet the purpose of the lab?

What did you observe that was unexpected?

What are some sources of error for this lab?

If you were to do this lab again, what would you do differently so you could do it better?

If you were to do another experiment to add on to this one, what question might you ask?

Give one example of how you might use this in "real life?" (other than science class)

### Questions

1.

2.

3.

4.

# Goals for My Classes

- Integrate more real-life examples into classes
  - Have students see more use of the scientific method
  - Use more inquiry and design labs
  - Use more technology and get students using more technology
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