



## Alignment Document State of Wyoming and Aventa Learning Physics

### Physics

| Standards  | Topics   | Benchmarks  | Unit Name | Course Topic Description |
|--|--|---|-----------|--------------------------|
| <p><b>1</b> In the context of unifying concepts and processes, students develop an understanding of scientific content through inquiry. Science is a dynamic process; concepts and content are best learned through inquiry and investigation.</p> | <p><b>0</b> Earth, Space, and Physical Systems</p> | <p><b>1.7</b> Geochemical Cycles: Students describe the Earth as a closed system and demonstrate a conceptual understanding of the following systems: geosphere, hydrosphere, atmosphere, and biosphere. Students explain the role of energy in each of these systems, such as weather patterns, global climate, weathering, and plate tectonics.</p>   |           |                          |
|  |  | <p><b>1.8</b> Origin and Evolution of the Earth System: Students investigate geologic time through comparing rock sequences, the fossil record, and decay rates of radioactive isotopes.</p>  |           |                          |
|  |  | <p><b>1.9</b> Origin and Evolution of the Universe: Students examine evidence for the Big Bang Theory and recognize the immense time scale involved in comparison to human-perceived time. They describe the process of star and planet formation, planetary and stellar evolution including the fusion process, element formation, and dispersion.</p> |           |                          |
|  |  | <p><b>1.10</b> Structure and Properties of Matter: Students describe the atomic structure of matter including subatomic particles, their</p>  |           |                          |

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|  | <p>properties, and interactions. They recognize that elements are organized into groups in the periodic table based on their outermost electrons and these groups have similar properties. They explain chemical bonding in terms of the transfer or sharing of electrons between atoms. Students describe physical states of matter and phase changes. Students differentiate between chemical and physical properties, and chemical and physical changes.</p> |  |  |
|  | <p><b>1.11 Chemical Reactions:</b> Students recognize that chemical reactions take place all around us. They realize that chemical reactions may release or consume energy, occur at different rates, and result in the formation of different substances. They identify the factors that affect reaction rates.</p>  |  |  |
|  | <p><b>1.12 Conservation of Energy and Increase in Disorder:</b> Students demonstrate an understanding of the laws of conservation of mass and energy within the context of physical and chemical changes. They realize the tendency for systems to increase in disorder.</p>  | <p>Energy and Motion</p> <p>Energy and Motion</p> <p>Heat and Thermodynamics</p>   | <p>Conservation of Mechanical Energy Lab</p> <p>Momentum Lab</p> <p>Heat</p>   |
|  | <p><b>1.13 Energy and Matter:</b> Students demonstrate an understanding of types of energy, energy transfer and transformations, and the relationship between energy and matter.</p>  | <p>Energy and Motion</p> <p>Energy and Motion</p> <p>Heat and Thermodynamics</p> <p>Electrostatics</p> <p>Introduction to Modern Physics</p> | <p>Work and Energy</p> <p>Momentum and Collisions</p> <p>Thermodynamics</p> <p>Electrical Energy</p> <p>Special Theory of Relativity</p> |

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|   |  | <p><b>1.14</b> Force and Motion: Students develop a conceptual understanding of Newton's Laws of Motion, gravity, electricity, and magnetism.</p> | <p>Physics and the Laws of Motion<br/>Energy and Motion<br/>Electrostatics<br/>Magnetism</p>   | <p>Forces and the Laws of Motion<br/>Circular Motion and Gravitation<br/>Electrical Energy<br/>Magnetism</p>  |
| <p><b>2</b> Students demonstrate knowledge, skills, and habits of mind necessary to safely perform scientific inquiry. Inquiry is the foundation for the development of content, teaching students the use of processes of science that enable them to construct and develop their own knowledge. Inquiry requires appropriate field, classroom, and laboratory experiences with suitable facilities and equipment.</p> |  | <p><b>2.1</b> Students research scientific information and present findings through appropriate means.</p>  |  |   |
|   |  | <p><b>2.2</b> Students use inquiry to conduct scientific investigations.</p>  |  |   |
|   |  | <p><b>2.2.A</b> Pose problems and identify questions and concepts to design and conduct an investigation.</p>                                     | <p>Covered in labs throughout the course:<br/>Physics and the Laws of Motion<br/>Physics and the Laws of Motion<br/>Physics and the Laws of Motion<br/>Energy and Motion<br/>Energy and Motion<br/>Energy and Motion<br/>Heat and Thermodynamics<br/>Heat and Thermodynamics<br/>Waves</p> | <p>Free-Fall Lab<br/>Projectile Motion Lab<br/>Forces and Friction Lab<br/>Conservation of Mechanical Energy Lab<br/>Momentum Lab<br/>Machines and Efficiency Lab<br/>Thermal Equilibrium Lab<br/>Piston Lab<br/>Simple Harmonic Motion Lab</p> |



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|  |  |   | Waves                                  | Wave Lab                                       |
|  |  |   | Waves                                  | Sound Lab                                      |
|  |  |   | Waves                                  | Converging Lenses Lab                          |
|  |  |   | Electrostatics                         | Electrostatics Lab                             |
|  |  |   | Electrostatics                         | Charges and Fields Lab                         |
|  |  |   | Electric Current                       | Ohm's Law Lab                                  |
|  |  |   | Electric Current                       | Ohm's Law and Factors Affecting Resistance Lab |
|  |  |   | Electric Current                       | Resistors in Series and Parallel Lab           |
|  |  |   | Magnetism                              | Magnetic Field of a Solenoid Lab               |
|  |  |   | Magnetism                              | Electromagnetic Induction Lab                  |
|  |  |   | Introduction to Modern Physics         | Photoelectric Effect Lab                       |
|  |  | <b>2.2.B</b> Collect, organize, analyze and appropriately represent data. | Covered in labs throughout the course: |  |
|  |  |   | Physics and the Laws of Motion         | Free-Fall Lab                                  |
|  |  |   | Physics and the Laws of Motion         | Projectile Motion Lab                          |
|  |  |   | Physics and the Laws of Motion         | Forces and Friction Lab                        |
|  |  |   | Energy and Motion                      | Conservation of Mechanical Energy              |



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|  |  |  | <p>Energy and Motion</p> <p>Energy and Motion</p> <p>Heat and Thermodynamics</p> <p>Heat and Thermodynamics</p> <p>Waves</p> <p>Waves</p> <p>Waves</p> <p>Waves</p> <p>Electrostatics</p> <p>Electrostatics</p> <p>Electric Current</p> <p>Electric Current</p> <p>Electric Current</p> <p>Magnetism</p> <p>Magnetism</p> <p>Introduction to Modern Physics</p> | <p>Lab</p> <p>Momentum Lab</p> <p>Machines and Efficiency Lab</p> <p>Thermal Equilibrium Lab</p> <p>Piston Lab</p> <p>Simple Harmonic Motion Lab</p> <p>Wave Lab</p> <p>Sound Lab</p> <p>Converging Lenses Lab</p> <p>Electrostatics Lab</p> <p>Charges and Fields Lab</p> <p>Ohm's Law Lab</p> <p>Ohm's Law and Factors Affecting Resistance Lab</p> <p>Resistors in Series and Parallel Lab</p> <p>Magnetic Field of a Solenoid Lab</p> <p>Electromagnetic Induction Lab</p> <p>Photoelectric Effect Lab</p> |
|  |  | <p><b>2.2.C</b> Give priority to evidence in drawing conclusions and making connections to</p> | <p>Covered in labs throughout the course:</p>   |  |



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|  |  | scientific concepts. | Physics and the Laws of Motion | Free-Fall Lab                                  |
|  |  |                      | Physics and the Laws of Motion | Projectile Motion Lab                          |
|  |  |                      | Physics and the Laws of Motion | Forces and Friction Lab                        |
|  |  |                      | Energy and Motion              | Conservation of Mechanical Energy Lab          |
|  |  |                      | Energy and Motion              | Momentum Lab                                   |
|  |  |                      | Energy and Motion              | Machines and Efficiency Lab                    |
|  |  |                      | Heat and Thermodynamics        | Thermal Equilibrium Lab                        |
|  |  |                      | Heat and Thermodynamics        | Piston Lab                                     |
|  |  |                      | Waves                          | Simple Harmonic Motion Lab                     |
|  |  |                      | Waves                          | Wave Lab                                       |
|  |  |                      | Waves                          | Sound Lab                                      |
|  |  |                      | Waves                          | Converging Lenses Lab                          |
|  |  |                      | Electrostatics                 | Electrostatics Lab                             |
|  |  |                      | Electrostatics                 | Charges and Fields Lab                         |
|  |  |                      | Electric Current               | Ohm's Law Lab                                  |
|  |  |                      | Electric Current               | Ohm's Law and Factors Affecting Resistance Lab |



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|  |  |   | Electric Current                       | Resistors in Series and Parallel Lab  |
|  |  |   | Magnetism                              | Magnetic Field of a Solenoid Lab      |
|  |  |   | Magnetism                              | Electromagnetic Induction Lab         |
|  |  |   | Introduction to Modern Physics         | Photoelectric Effect Lab              |
|  |  | 2.2.D Clearly and accurately communicate the result of the investigation. | Covered in labs throughout the course: |                                       |
|  |  |   | Physics and the Laws of Motion         | Free-Fall Lab                         |
|  |  |   | Physics and the Laws of Motion         | Projectile Motion Lab                 |
|  |  |   | Physics and the Laws of Motion         | Forces and Friction Lab               |
|  |  |   | Energy and Motion                      | Conservation of Mechanical Energy Lab |
|  |  |   | Energy and Motion                      | Momentum Lab                          |
|  |  |   | Energy and Motion                      | Machines and Efficiency Lab           |
|  |  |   | Heat and Thermodynamics                | Thermal Equilibrium Lab               |
|  |  |   | Heat and Thermodynamics                | Piston Lab                            |
|  |  |   | Waves                                  | Simple Harmonic Motion Lab            |
|  |  |   | Waves                                  | Wave Lab                              |
|  |  |   | Waves                                  | Sound Lab                             |

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|  |  |   | Waves                          | Converging Lenses Lab                          |
|  |  |   | Electrostatics                 | Electrostatics Lab                             |
|  |  |   | Electrostatics                 | Charges and Fields Lab                         |
|  |  |   | Electric Current               | Ohm's Law Lab                                  |
|  |  |   | Electric Current               | Ohm's Law and Factors Affecting Resistance Lab |
|  |  |   | Electric Current               | Resistors in Series and Parallel Lab           |
|  |  |   | Magnetism                      | Magnetic Field of a Solenoid Lab               |
|  |  |   | Magnetism                      | Electromagnetic Induction Lab                  |
|  |  |   | Introduction to Modern Physics | Photoelectric Effect Lab                       |
|  |  | <b>2.3</b> Students clearly and accurately communicate the result of their own work as well as information from other sources.                              | Waves                          | Sound Lab                                      |
|  |  |   | Introduction to Modern Physics | Photoelectric Effect Lab                       |
|  |  | <b>2.4</b> Students investigate the relationships between science and technology and the role of technological design in meeting human needs.               | Waves                          | Waves in Elastic Medium and Sound              |
|  |  |   | Waves                          | Light  |
|  |  | <b>2.5</b> Students properly use appropriate scientific and safety equipment, recognize hazards and safety symbols, and observe standard safety procedures. |                                |  |
| <b>3</b> Students recognize the nature of science, its history, and its connections to personal, social, economic, |  | <b>3.1</b> Students examine the nature and history of science.  |                                |  |
|  |  | <b>3.1.A</b> As scientific knowledge evolves, it impacts personal, social, economic, and  | Introduction to Modern Physics | Atom Models                                    |



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| <p>and political decisions. Historically, scientific events have had significant impacts on our cultural heritage.</p> |  | political decisions.  |  |  |
|  |  | <b>3.1.B</b> The historical misuse of scientific information to make personal, social, economic, and political decisions.   |  |  |
|  |  | <b>3.2</b> Students examine how scientific information is used to make decisions.   |  |  |
|  |  | <b>3.2.A</b> Interdisciplinary connections of the sciences and connections to other subject areas and career opportunities. |  |  |
|  |  | <b>3.2.B</b> The role of science in solving personal, local, national, and global problems.                                 |  |  |
|  |  | <b>3.2.C</b> The origins, limitations, and conservation of natural resources, including Wyoming examples.                   |  |  |