

## MCS Physics Subject Group Overview

| Unit Name                                       | 1D Motion   | 2D Motion  | Newton's Laws   | Momentum  | Energy  | Nuclear   | Electricity & Magnetism   | Waves  |
|---|---|--|---|---|---|---|---|--|
| Time Frame                                      | 6 weeks   | 6 weeks  | 6 weeks   | 3 weeks   | 5 weeks   | 3 weeks   | 4 weeks   | 3 weeks  |
| Standards                                       | SP1.a, SP1.b, SP1.c   | SP1.c,d, SP2.d   | SP2.a, SP2.b, SP2.c, SP2.d, SP2.e   | SP3.d   | SP3.a , SP3.b , SP3.c   | SP6.a, SP6.b, SP6.c   | SP5.a, SP5.b, SP5.c, SP5.d, SP5.e   | SP4.a, SP4.b, SP4.c, SP4.d, SP4.e, SP4.f, SP4.g  |
| Approaches To Learning Instructional Strategies | <p><b>SEP</b></p> <ul style="list-style-type: none"> <li>Using Mathematics and Computational Thinking,</li> <li>Engaging in Arguments from Evidence</li> </ul> <p><b>ATL</b></p> <p>Research Skills<br/>Thinking Skills<br/>Collaboration Skills<br/>Communication Skills</p> | <p><b>SEP</b></p> <ul style="list-style-type: none"> <li>Using Mathematics and Computational Thinking, Analyzing and Interpreting Data</li> <li>Planning and Carrying out Investigations</li> </ul> <p><b>ATL</b></p> <p>Research Skills<br/>Thinking Skills<br/>Collaboration Skills<br/>Communication Skills</p> | <p><b>SEP</b></p> <ul style="list-style-type: none"> <li>Using Mathematics and Computational Thinking, Analyzing and Interpreting Data</li> <li>Make inferences and draw conclusions, Give and receive meaningful feedback, Process data and record results</li> </ul> <p><b>ATL</b></p> <p>Research Skills<br/>Thinking Skills<br/>Collaboration Skills<br/>Communication Skills</p> | <p><b>SEP</b></p> <ul style="list-style-type: none"> <li>Using Mathematics and Computational Thinking, Analyzing and Interpreting Data</li> <li>Make inferences and draw conclusions, Give and receive meaningful feedback, Process data and record results</li> </ul> <p><b>ATL</b></p> <p>Research Skills<br/>Thinking Skills<br/>Collaboration Skills<br/>Communication Skills</p> | <p><b>SEP</b></p> <ul style="list-style-type: none"> <li>Using Mathematics and Computational Thinking,</li> <li>Planning and Carrying out Investigations</li> <li>Collect, record, and analyze data</li> </ul> <p><b>ATL</b></p> <p>Research Skills<br/>Thinking Skills<br/>Collaboration Skills<br/>Communication Skills</p> | <ul style="list-style-type: none"> <li>Obtaining, Evaluation, and Communication Information</li> <li>Make inferences and draw conclusions</li> </ul> <p><b>ATL</b></p> <p>Research Skills<br/>Thinking Skills<br/>Collaboration Skills<br/>Communication Skills</p> | <p><b>SEP</b></p> <ul style="list-style-type: none"> <li>Asking Questions and Defining Problems</li> <li>Give and receive meaningful feedback</li> </ul> <p><b>ATL</b></p> <p>Research Skills<br/>Thinking Skills<br/>Collaboration Skills<br/>Communication Skills</p> | <p><b>SEP</b></p> <ul style="list-style-type: none"> <li>Developing and Using Models</li> <li>Make guesses, ask “what if” questions and generate testable hypothesis</li> </ul> <p><b>ATL</b></p> <p>Research Skills<br/>Thinking Skills<br/>Collaboration Skills<br/>Communication Skills</p> |
| Statement of Inquiry                            | Modeling changes in motion graphically and mathematically   | Modeling changes in motion graphically and mathematically predicts future movement.  | The relationships between interacting objects cause changes in their motion that can be   | Modeling transfers of momentum to predict the outcome of car crashes.   | Energy changing from one form to another can be captured for useful means.  | The transformations of atoms follow predictable patterns that can be used for   | The movement of electrons can be modeled by examining specific relationships,   | The nature of waves can be discovered by examining their interactions with matter.   |

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|                                       | <p>predicts future movement.</p> <p><b>Phenomenon:</b> All motion is composed of just a few components acting together creating a variety of different motion.</p> | <p><b>Phenomenon:</b> All motion is composed of just a few components acting together creating a variety of different motion.</p> | <p>used to discover their intrinsic properties.</p> <p><b>Phenomenon:</b> Acceleration only occurs if an unequal force is also present.</p>   | <p><b>Phenomenon:</b> Momentum is conserved in every interaction between two bodies, regardless of how they interact.</p>   | <p><b>Phenomenon:</b> Energy is always conserved, even when the motion is not uniform or friction is involved.</p>  | <p>the production of power.</p> <p><b>Phenomenon:</b> Atomic nuclei are unstable (radioactive) if you do not have the right number of protons and neutrons.</p>   | <p>allowing for transmission of information.</p> <p><b>Phenomenon:</b> Electrical power is one of the most efficient methods for transporting energy.</p>   | <p><b>Phenomenon:</b> Vibrations propagate in the form of waves. Waves transfer energy without transferring mass.</p>  |
| <b>Global Context</b>                 | Scientific and Technical Innovation  | Scientific and Technical Innovation   | Scientific and Technical Innovation   | Scientific and Technical Innovation   | Scientific and Technical Innovation   | Scientific and Technical Innovation   | Scientific and Technical Innovation   | Scientific and Technical Innovation  |
| <b>Key Concepts</b>                   | Cause & Effect (CCC)<br>Stability & Change (CCC)<br>Systems & System (MYP)<br>Models (CCC)<br>Patterns (CCC)   | Cause & Effect (CCC)<br>Stability & Change (CCC)<br>Systems & System (MYP)<br>Models (CCC)<br>Patterns (CCC)                      | Patterns (CCC)<br>Matter & Energy (MYP/CCC)<br>Structure & Function (CCC)   | Cause & Effect (CCC)<br>Stability & Change (CCC)<br>Systems & System Models (MYP/CCC)<br>Patterns (CCC)   | Stability & Change (CCC)<br>Matter & Energy (MYP/CCC)<br>Patterns (CCC)   | Matter & Energy (MYP/CCC)<br>Stability & Change (CCC)<br>Scale, Proportion & Quantity (CCC)   | Scale, Proportion & Quantity (CCC)<br>Matter & Energy (MYP/CCC)<br>Stability & Change (CCC)   | Patterns (CCC)<br>Scale, Proportion & Quantity (CCC)<br>Systems & System Models (MYP/CCC)  |
| <b>Related Concepts</b>               | Movement & Energy  | Movement & Energy   | Movement & Evidence   | Movement and Momentum   | Energy & Transformation   | Energy & Form   | Energy & Interactions   | Movement & Energy  |
| <b>Design Cycle Transdisciplinary</b> | <b>CORE IDEAS</b> <ul style="list-style-type: none"> <li>● Kinematics</li> <li>● Scalars</li> <li>● Vectors</li> <li>● Displacement</li> </ul>                     | <b>CORE IDEAS</b> <ul style="list-style-type: none"> <li>● Projectile Motion</li> <li>● Vector Diagrams</li> </ul>                | <b>CORE IDEAS</b> <ul style="list-style-type: none"> <li>● Laws of Motion</li> <li>● Free Body Diagrams</li> <li>● Acceleration</li> <li>● Friction</li> <li>● Universal Gravitation</li> </ul> | <b>CORE IDEAS</b> <ul style="list-style-type: none"> <li>● Momentum</li> <li>● Impulse</li> <li>● Conservation of momentum</li> <li>● Transfer of momentum</li> </ul> | <b>CORE IDEAS</b> <ul style="list-style-type: none"> <li>● Potential energy</li> <li>● Kinetic energy</li> <li>● Work</li> <li>● Power</li> <li>● Conservation of Mechanical energy</li> <li>● Work Energy Theorem</li> </ul> | <b>CORE IDEAS</b> <ul style="list-style-type: none"> <li>● Atomic structure</li> <li>● Nuclear Notation</li> <li>● Ions &amp; Isotopes</li> <li>● Nuclear Decay</li> <li>● Nuclear Decay and Half Life</li> <li>● Energy Released in nuclear reactions</li> </ul> | <b>CORE IDEAS</b> <ul style="list-style-type: none"> <li>● Electricity</li> <li>● Circuits</li> <li>● Magnetism</li> <li>● Static Electricity</li> <li>● Voltage</li> <li>● Resistance</li> </ul> | <b>CORE IDEAS</b> <ul style="list-style-type: none"> <li>● Electromagnetic radiation</li> <li>● Transverse Waves</li> <li>● Properties of Waves</li> <li>● Wave Patterns</li> <li>● Boundary Behavior</li> </ul> |

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| <b>Differentiation For Tiered Learners</b> | Marietta City Schools teachers provide specific differentiation of learning experiences for all students. Details for differentiation for learning experiences are included on the district unit planners. |
| <b>Course Levels</b>                       | <b>Marietta City Schools offers Enhanced, Honors, Accelerated, and AP classes to provide differentiated learning experiences for students.</b>   |