

Main Criteria: Forward Education
Secondary Criteria: Mississippi College & Career Readiness Standards
Subjects: Mathematics, Science, Technology Education
Grades: 11, 12, Key Stage 4

Forward Education

Autonomous Electric Vehicles of the Future

Mississippi College & Career Readiness Standards
Mathematics
 Grade 11 - Adopted: 2016

| THEME | MS.MP. | Standards for Mathematical Practice |
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| SUBJECT | MP.1. | Make sense of problems and persevere in solving them. |
| SUBJECT | MP.2. | Reason abstractly and quantitatively. |
| SUBJECT | MP.3. | Construct viable arguments and critique the reasoning of others. |
| SUBJECT | MP.4. | Model with mathematics. |
| SUBJECT | MP.8. | Look for and express regularity in repeated reasoning. |

| THEME | MS.AI. | Algebra I |
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| SUBJECT | AI.A-CED. | Algebra: Creating Equations (A-CED) |
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| STANDARD | | Create equations that describe numbers or relationships |

OBJECTIVE A-CED.2. Create equations in two variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

| THEME | MS.AI. | Algebra I |
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| SUBJECT | AI.A-REI. | Algebra: Reasoning with Equations and Inequalities (A-REI) |
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| STANDARD | | Understand solving equations as a process of reasoning and explain the reasoning |

OBJECTIVE A-REI.1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

| THEME | MS.AI. | Algebra I |
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| SUBJECT | AI.F-IF. | Functions: Interpreting Functions (F-IF) |
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| STANDARD | | Analyze functions using different representations |

OBJECTIVE F-IF.7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

OBJECTIVE F-IF.7.a. Graph functions (linear and quadratic) and show intercepts, maxima, and minima.

| THEME | MS.AI. | Algebra I |
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| SUBJECT | AI.F-LE. | Functions: Linear, Quadratic, and Exponential Models (F-LE) |
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| STANDARD | | Construct and compare linear, quadratic, and exponential models and solve problems |
| OBJECTIVE | F-LE.1. | Distinguish between situations that can be modeled with linear functions and with exponential functions. |

OBJECTIVE F-LE.1.a. Prove that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.

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| THEME | MS.G. | Geometry |
| SUBJECT | G-GPE. | Geometry: Expressing Geometric Properties with Equations (G-GPE) |
| STANDARD | | Use coordinates to prove simple geometric theorems algebraically |

OBJECTIVE G-GPE.5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).

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| THEME | MS.AII. | Algebra II |
| SUBJECT | AII.A-CED. | Algebra: Creating Equations (A-CED) |
| STANDARD | | Create equations that describe numbers or relationships |

OBJECTIVE A-CED.2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. [Note this standard appears in previous courses with a slight variation in the standard language.]

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| THEME | MS.AII. | Algebra II |
| SUBJECT | AII.A-REI. | Algebra: Reasoning with Equations and Inequalities (A-REI) |
| STANDARD | | Understand solving equations as a process of reasoning and explain the reasoning |

OBJECTIVE A-REI.1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

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| THEME | MS.IMI. | Integrated Mathematics I |
| SUBJECT | IMI.A-CED. | Algebra: Creating Equations (A-CED) |
| STANDARD | | Create equations that describe numbers or relationships |

OBJECTIVE A-CED.2. Create equations in two variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. [Note this standard appears in future courses with a slight variation in the standard language.]

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| THEME | MS.IMI. | Integrated Mathematics I |
| SUBJECT | IMI.F-IF. | Functions: Interpreting Functions (F-IF) |
| STANDARD | | Analyze functions using different representations |

OBJECTIVE F-IF.7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

OBJECTIVE F-IF.7.a. Graph functions (linear and quadratic) and show intercepts, maxima, and minima.

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| THEME | MS.IMI. | Integrated Mathematics I |
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| SUBJECT | IMI.F-LE. | Functions: Linear, Quadratic, and Exponential Models (F-LE) |
| STANDARD | | Construct and compare linear, quadratic, and exponential models and solve problems |
| OBJECTIVE | F-LE.1. | Distinguish between situations that can be modeled with linear functions and with exponential functions. |

OBJECTIVE F-LE.1.a. Prove that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.

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| THEME | MS.IMII. | Integrated Mathematics II |
| SUBJECT | IMII.A-CED. | Algebra: Creating Equations (A-CED) |
| STANDARD | | Create equations that describe numbers or relationships |

OBJECTIVE A-CED.2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. [Note this standard appears in previous courses with a slight variation in the standard language.]

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| THEME | MS.IMII. | Integrated Mathematics II |
| SUBJECT | IMII.A-REI. | Algebra: Reasoning with Equations and Inequalities (A-REI) |
| STANDARD | | Understand solving equations as a process of reasoning and explain the reasoning |

OBJECTIVE A-REI.1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

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| THEME | MS.IMII. | Integrated Mathematics II |
| SUBJECT | IMII.F-IF. | Functions: Interpreting Functions (F-IF) |
| STANDARD | | Analyze functions using different representations |

OBJECTIVE F-IF.7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

OBJECTIVE F-IF.7.a. Graph linear and quadratic functions and show intercepts, maxima, and minima.

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| THEME | MS.IMIII. | Integrated Mathematics III |
| SUBJECT | IMIII.A-CED. | Algebra: Creating Equations (A-CED) |
| STANDARD | | Create equations that describe numbers or relationships |

OBJECTIVE A-CED.2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. [Note this standard appears in previous courses with a slight variation in the standard language.]

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| THEME | MS.IMIII. | Integrated Mathematics III |
| SUBJECT | IMIII.A-REI. | Algebra: Reasoning with Equations and Inequalities (A-REI) |
| STANDARD | | Understand solving equations as a process of reasoning and explain the reasoning |

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| OBJECTIVE | A-REI.1. | Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method. |
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| THEME | MS.IM.III. | Integrated Mathematics III |
| SUBJECT | IM.III.G-GPE. | Geometry: Expressing Geometric Properties with Equations (G-GPE) |
| STANDARD | | Use coordinates to prove simple geometric theorems algebraically |

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| OBJECTIVE | G-GPE.5. | Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point). |
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| THEME | MS.A.III. | Algebra III |
| SUBJECT | A.III.F. | Functions |
| STANDARD | | Analyze functions using different representations |

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| OBJECTIVE | A.III.F.23. | Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. |
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| THEME | MS.A.III. | Algebra III |
| SUBJECT | A.III.G. | Geometry |
| STANDARD | | Recognize, sketch, and transform graphs of functions |

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| OBJECTIVE | A.III.G.38. | Describe the attributes of graphs and the general equations of parent functions (linear, quadratic, cubic, absolute value, rational, exponential, logarithmic, square root, cube root, and greatest integer). |
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| THEME | MS.F.AC. | Foundations of Algebra Course |
| SUBJECT | F.AC.EI. | Equations and Inequalities |

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| STANDARD | F.AC.EI.8. | Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p , q , and r are specific rational numbers. Solve equations of these forms fluently. (7.EE.4a) |
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| THEME | MS.F.AC. | Foundations of Algebra Course |
| SUBJECT | F.AC.F. | Functions |

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| STANDARD | F.AC.F.17 | Create and graph the equation of a linear function given the rate of change and y-intercept. Compare and contrast up to three linear functions written in a various forms (i.e., point-slope, slope-intercept, standard form). |
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| STANDARD | F.AC.F.18 | Given two points, a graph, a table of values, a mapping, or a real-world context determine the linear function that models this information. Fluently convert between the point-slope, slope-intercept, and standard form of a line. |
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**Mississippi College & Career Readiness Standards
Mathematics
Grade 12 - Adopted: 2016**

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| THEME | MS.MP. | Standards for Mathematical Practice |
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| SUBJECT | MP.1. | Make sense of problems and persevere in solving them. |
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| SUBJECT | MP.2. | Reason abstractly and quantitatively. |
| SUBJECT | MP.3. | Construct viable arguments and critique the reasoning of others. |
| SUBJECT | MP.4. | Model with mathematics. |
| SUBJECT | MP.8. | Look for and express regularity in repeated reasoning. |

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| THEME | MS.AI. | Algebra I |
| SUBJECT | AI.A-CED. | Algebra: Creating Equations (A-CED) |
| STANDARD | | Create equations that describe numbers or relationships |

OBJECTIVE A-CED.2. Create equations in two variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

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| THEME | MS.AI. | Algebra I |
| SUBJECT | AI.A-REI. | Algebra: Reasoning with Equations and Inequalities (A-REI) |
| STANDARD | | Understand solving equations as a process of reasoning and explain the reasoning |

OBJECTIVE A-REI.1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

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| THEME | MS.AI. | Algebra I |
| SUBJECT | AI.F-IF. | Functions: Interpreting Functions (F-IF) |
| STANDARD | | Analyze functions using different representations |

OBJECTIVE F-IF.7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

OBJECTIVE F-IF.7.a. Graph functions (linear and quadratic) and show intercepts, maxima, and minima.

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| THEME | MS.G. | Geometry |
| SUBJECT | G-GPE. | Geometry: Expressing Geometric Properties with Equations (G-GPE) |
| STANDARD | | Use coordinates to prove simple geometric theorems algebraically |

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| THEME | MS.AII. | Algebra II |
| SUBJECT | AII.A-CED. | Algebra: Creating Equations (A-CED) |
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| THEME | MS.AII. | Algebra II |
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| THEME | MS.IMI. | Integrated Mathematics I |
| SUBJECT | IMI.A-CED. | Algebra: Creating Equations (A-CED) |
| STANDARD | | Create equations that describe numbers or relationships |

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| THEME | MS.IMI. | Integrated Mathematics I |
| SUBJECT | IMI.F-IF. | Functions: Interpreting Functions (F-IF) |
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| THEME | MS.IMI. | Integrated Mathematics I |
| SUBJECT | IMI.F-LE. | Functions: Linear, Quadratic, and Exponential Models (F-LE) |
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| THEME | MS.IMII. | Integrated Mathematics II |
| SUBJECT | IMII.A-CED. | Algebra: Creating Equations (A-CED) |
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| THEME | MS.IMII. | Integrated Mathematics II |
| SUBJECT | IMII.A-REI. | Algebra: Reasoning with Equations and Inequalities (A-REI) |
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| OBJECTIVE | A-REI.1. | Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method. |
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| THEME | MS.IMII. | Integrated Mathematics II |
| SUBJECT | IMII.F-IF. | Functions: Interpreting Functions (F-IF) |
| STANDARD | | Analyze functions using different representations |

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| OBJECTIVE | F-IF.7. | Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. |
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| OBJECTIVE | F-IF.7.a. | Graph linear and quadratic functions and show intercepts, maxima, and minima. |
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| THEME | MS.IMIII. | Integrated Mathematics III |
| SUBJECT | IMIII.A-CED. | Algebra: Creating Equations (A-CED) |
| STANDARD | | Create equations that describe numbers or relationships |

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| OBJECTIVE | A-CED.2. | Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. [Note this standard appears in previous courses with a slight variation in the standard language.] |
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| THEME | MS.IMIII. | Integrated Mathematics III |
| SUBJECT | IMIII.A-REI. | Algebra: Reasoning with Equations and Inequalities (A-REI) |
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| THEME | MS.IMIII. | Integrated Mathematics III |
| SUBJECT | IMIII.G-GPE. | Geometry: Expressing Geometric Properties with Equations (G-GPE) |
| STANDARD | | Use coordinates to prove simple geometric theorems algebraically |

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| OBJECTIVE | G-GPE.5. | Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point). |
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| THEME | MS.AIII. | Algebra III |
| SUBJECT | AIII.F. | Functions |

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| STANDARD | | Analyze functions using different representations |
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OBJECTIVE AIII.F.23. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

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| THEME | MS.AIII. | Algebra III |
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| SUBJECT | AIII.G. | Geometry |
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|-----------------|--|---|
| STANDARD | | Recognize, sketch, and transform graphs of functions |
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OBJECTIVE AIII.G.38. Describe the attributes of graphs and the general equations of parent functions (linear, quadratic, cubic, absolute value, rational, exponential, logarithmic, square root, cube root, and greatest integer).

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| THEME | MS.FAC. | Foundations of Algebra Course |
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| SUBJECT | FAC.EI. | Equations and Inequalities |
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STANDARD FAC.EI.8. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p , q , and r are specific rational numbers. Solve equations of these forms fluently. (7.EE.4a)

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| THEME | MS.FAC. | Foundations of Algebra Course |
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| SUBJECT | FAC.F. | Functions |
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STANDARD FAC.F.17 Create and graph the equation of a linear function given the rate of change and y-intercept. Compare and contrast up to three linear functions written in a various forms (i.e., point-slope, slope-intercept, standard form).

STANDARD FAC.F.18 Given two points, a graph, a table of values, a mapping, or a real-world context determine the linear function that models this information. Fluently convert between the point-slope, slope-intercept, and standard form of a line.

Mississippi College & Career Readiness Standards

Science

Grade 11 - Adopted: 2018

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| THEME | MS.BIO. | Biology |
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| SUBJECT | | Interdependence of Organisms and Their Environments |
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| STANDARD | BIO.5. | Students will investigate and evaluate the interdependence of living organisms and their environment. |
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OBJECTIVE BIO.5.3. Analyze and interpret quantitative data to construct an explanation for the effects of greenhouse gases on the carbon dioxide cycle and global climate.

OBJECTIVE BIO.5.8. Enrichment: Use an engineering design process to create a solution that addresses changing ecological conditions (e.g., climate change, invasive species, loss of biodiversity, human population growth, habitat destruction, biomagnification, or natural phenomena).

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| THEME | MS.CHE. | Chemistry |
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| SUBJECT | | Thermochemistry (Enrichment) |
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| STANDARD | CHE.10. | Enrichment: Students will understand that energy is exchanged or transformed in all chemical reactions. |
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OBJECTIVE CHE.10.2. Enrichment: Classify chemical reactions and phase changes as exothermic or endothermic based on enthalpy values. Use a graphical representation to illustrate the energy changes involved.

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| OBJECTIVE | CHE.10.3. | Enrichment: Analyze and interpret data from energy diagrams and investigations to support claims that the amount of energy released or absorbed during a chemical reaction depends on changes in total bond energy. |
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| THEME | MS.ESS. | Earth and Space Science |
| SUBJECT | | Earth's Systems and Cycles |
| STANDARD | ESS.3. | Students will develop an understanding of Earth's systems and cycles. |

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| OBJECTIVE | ESS.3.6. | Construct an explanation from data sets to obtain and evaluate scientific information to construct scientific arguments on changes in climate caused by various natural factors (e.g., plate tectonics and continent location and Milankovitch cycles) versus anthropogenic factors (e.g., fossil fuel use and agricultural factors). |
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| THEME | MS.ESS. | Earth and Space Science |
| SUBJECT | | Earth's Resources and Human Activity |
| STANDARD | ESS.4. | Students will develop an understanding of Earth's resources and the impact of human activities. |

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| OBJECTIVE | ESS.4.1. | Research, evaluate, and communicate about how human life on Earth shapes Earth's systems and responds to the interaction of Earth's systems (e.g., geosphere, hydrosphere, atmosphere, and biosphere). Examine how geochemical and ecological processes interact through time to cycle matter and energy and how human activity alters the rates of these processes. |
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| THEME | MS.ENV. | Environmental Science |
| SUBJECT | | Natural Resources Use and Conservation |
| STANDARD | ENV.2. | Students will relate the impact of human activities on the environment, conservation activities, and efforts to maintain and restore ecosystems. |

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| OBJECTIVE | ENV.2.2. | Investigate and research the pros and cons of using traditional sources of energy (e.g., fossil fuels) and alternative sources of energy (e.g., water, wind, geothermal, biomass/biofuels, solar). |
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| OBJECTIVE | ENV.2.4. | Examine solutions for developing, conserving, managing, recycling, and reusing energy and mineral resources to minimize impacts in natural systems (e.g., agricultural soil use, mining for coal, construction sites, and exploration of petroleum and natural gas sources). |
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| THEME | MS.ENV. | Environmental Science |
| SUBJECT | | Human Activities and Climate Change |
| STANDARD | ENV.3. | Students will discuss the direct and indirect impacts of certain types of human activities on the Earth's climate. |

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| OBJECTIVE | ENV.3.1. | Use a model to describe cycling of carbon through the ocean, atmosphere, soil, and biosphere and how increases in carbon dioxide concentrations have resulted in atmospheric and climate changes. |
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| OBJECTIVE | ENV.3.2. | Interpret data and climate models to predict how global and regional climate change can affect Earth's systems (e.g., precipitation, temperature, impacts on sea level, global ice volumes, and atmosphere and ocean composition). |
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| OBJECTIVE | ENV.3.4. | Enrichment: Determine mathematically an individual's impact on the environment (carbon footprint, water usage, landfill contribution) and develop a plan to reduce personal contribution. |
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| THEME | MS.ENV. | Environmental Science |
| SUBJECT | | Human Sustainability |

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| STANDARD | ENV.4. | Students will demonstrate an understanding of the interdependence of human sustainability and the environment. |
| OBJECTIVE | ENV.4.1. | Identify human impact and develop a solution for protection of the atmosphere, considering pollutants (e.g., acid rain, air pollution, smog, ozone layer, or increased levels of greenhouse gases) and the impacts of pollutants on human health (e.g., asthma, COPD, emphysema, and cancer). |
| OBJECTIVE | ENV.4.3. | Enrichment: Research and analyze case studies to determine the impact of human-related and natural environmental changes on human health and communicate possible solutions to reduce/resolve the dilemma. |
| OBJECTIVE | ENV.4.5. | Enrichment: Use an engineering design process to define a problem, design, construct, evaluate, and improve a device or method to reduce or prevent human impact on a natural resource (e.g., build a water filter, design an air purifier, develop a method to prevent parking lot pollution from entering a watershed). |

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| THEME | MS.FB. | Foundations of Biology |
| SUBJECT | | History of Biology and Impacts on Society |
| STANDARD | FB.1. | Students will relate the importance of significant historical biological experiments and their impact of these on research, development, and society. |

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| OBJECTIVE | FB.1.4. | Enrichment: Research, analyze, explain, and communicate the influence of society, including cultural components, on the direction and progress of science and technology (e.g., medical treatments, emerging viruses, antibiotic resistance, vaccinations and re-emergent diseases, alternative energy development, and/or biomimicry). |
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Grade 11 - Adopted: 2017

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| THEME | MS.FSL. | Foundations of Science Literacy |
| SUBJECT | | History of Science and Impacts on Society |
| STANDARD | FSL.1. | Students will relate the importance of significant historical experiments and their impact on research and development. |

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| OBJECTIVE | FSL.1.2. | Research, analyze, explain, and communicate how scientific enterprise relates to society and classic inventions (e.g., microscope, telescope, computer, and telephone). |
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| OBJECTIVE | FSL.1.3. | Identify and communicate the impact of mathematics and technology in the development of scientific thought and the practice of science (e.g., space exploration, the human genome project, and ocean exploration). |
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| OBJECTIVE | FSL.1.4. | Enrichment: Research, analyze, explain, and communicate the influence of society, including cultural components, on the direction and progress of science and technology (e.g., medical treatments, antibiotic resistance, alternative energy development, and biomimicry). |
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| THEME | MS.FSL. | Foundations of Science Literacy |
| SUBJECT | | Nature of Technology and Engineering |
| STANDARD | FSL.2. | Students will identify, research, and communicate the development of technology and engineering practices. |

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| OBJECTIVE | FSL.2.1. | Research and present a technology that was developed through engineering design. Identify its purpose, how it has advanced through alterations in design (e.g., systems that provide homes and businesses with utilities, parking structures, park and recreational structures, and traffic flow), and careers related to its use). |
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| OBJECTIVE | FSL.2.2. | Use an engineering design process to identify a problem within the local community, and propose and develop a possible solution for that problem. |
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| THEME | MS.FSL. | Foundations of Science Literacy |
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| SUBJECT | | Nature of Science |
| STANDARD | FSL.3B. | Students will apply scientific literacy and thinking skills to analyze and interpret data found in various graphics including, but not limited to, those found in sample ACT science passages. |

OBJECTIVE FSL.3B.5. Analyze presented information when given new information (e.g., given a new scenario, how would a given scenario be changed).

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| THEME | MS.FSL. | Foundations of Science Literacy |
| SUBJECT | | Nature of Science |
| STANDARD | FSL.3C. | Students will apply scientific literacy and thinking skills to analyze scientific investigations found in various experimental designs including, but not limited to, those found in sample ACT science passages. |

OBJECTIVE FSL.3C.1. Analyze the methods and choice of tools used in simple and complex experimental designs.

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| THEME | MS.PHS. | Physical Science |
| SUBJECT | | Electricity |
| STANDARD | PHS.9. | Students will explore basic principles of magnetism and electricity (e.g., static electricity, current electricity, and circuits). |

OBJECTIVE PHS.9.2. Distinguish between magnets, motors, and generators, and evaluate modern industrial uses of each.

OBJECTIVE PHS.9.3. Enrichment: Use an engineering design process to construct a working electric motor to perform a task. Communicate the design process and comparisons of task performance efficiencies.

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| THEME | MS.PHY. | Physics |
| SUBJECT | | Work and Energy |
| STANDARD | PHY.3. | Students will develop an understanding of concepts related to work and energy. |

OBJECTIVE PHY.3.11. Enrichment: Use an engineering design process to design and build a themed Rube Goldberg-type machine that has six or more steps and complete a desired task (e.g., pop a balloon, fill a bottle, shoot a projectile, or raise an object 35 cm) within an allotted time. Include a poster that demonstrates the calculations of the energy transformation or efficiency of the machine.

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| THEME | MS.PHY. | Physics |
| SUBJECT | | Electricity and Magnetism |
| STANDARD | PHY.5. | Students will investigate the key components of electricity and magnetism. |

OBJECTIVE PHY.5.1. Analyze and explain electricity and the relationship between electricity and magnetism.

OBJECTIVE PHY.5.8. Enrichment: Design and construct a simple motor to develop an explanation of how the motor transforms electrical energy into mechanical energy and work.

**Mississippi College & Career Readiness Standards
Science**

Grade 12 - Adopted: 2018

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| THEME | MS.BIO. | Biology |
| SUBJECT | | Interdependence of Organisms and Their Environments |
| STANDARD | BIO.5. | Students will Investigate and evaluate the interdependence of living organisms and their environment. |

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| OBJECTIVE | BIO.5.3. | Analyze and interpret quantitative data to construct an explanation for the effects of greenhouse gases on the carbon dioxide cycle and global climate. |
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| OBJECTIVE | BIO.5.8. | Enrichment: Use an engineering design process to create a solution that addresses changing ecological conditions (e.g., climate change, invasive species, loss of biodiversity, human population growth, habitat destruction, biomagnification, or natural phenomena). |
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| THEME | MS.CHE. | Chemistry |
| SUBJECT | | Thermochemistry (Enrichment) |
| STANDARD | CHE.10. | Enrichment: Students will understand that energy is exchanged or transformed in all chemical reactions. |

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| OBJECTIVE | CHE.10.2. | Enrichment: Classify chemical reactions and phase changes as exothermic or endothermic based on enthalpy values. Use a graphical representation to illustrate the energy changes involved. |
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| OBJECTIVE | CHE.10.3. | Enrichment: Analyze and interpret data from energy diagrams and investigations to support claims that the amount of energy released or absorbed during a chemical reaction depends on changes in total bond energy. |
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| THEME | MS.ESS. | Earth and Space Science |
| SUBJECT | | Earth's Systems and Cycles |
| STANDARD | ESS.3. | Students will develop an understanding of Earth's systems and cycles. |

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| OBJECTIVE | ESS.3.6. | Construct an explanation from data sets to obtain and evaluate scientific information to construct scientific arguments on changes in climate caused by various natural factors (e.g., plate tectonics and continent location and Milankovitch cycles) versus anthropogenic factors (e.g., fossil fuel use and agricultural factors). |
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| THEME | MS.ESS. | Earth and Space Science |
| SUBJECT | | Earth's Resources and Human Activity |
| STANDARD | ESS.4. | Students will develop an understanding of Earth's resources and the impact of human activities. |

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| OBJECTIVE | ESS.4.1. | Research, evaluate, and communicate about how human life on Earth shapes Earth's systems and responds to the interaction of Earth's systems (e.g., geosphere, hydrosphere, atmosphere, and biosphere). Examine how geochemical and ecological processes interact through time to cycle matter and energy and how human activity alters the rates of these processes. |
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| THEME | MS.ENV. | Environmental Science |
| SUBJECT | | Natural Resources Use and Conservation |
| STANDARD | ENV.2. | Students will relate the impact of human activities on the environment, conservation activities, and efforts to maintain and restore ecosystems. |

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| OBJECTIVE | ENV.2.2. | Investigate and research the pros and cons of using traditional sources of energy (e.g., fossil fuels) and alternative sources of energy (e.g., water, wind, geothermal, biomass/biofuels, solar). |
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| OBJECTIVE | ENV.2.4. | Examine solutions for developing, conserving, managing, recycling, and reusing energy and mineral resources to minimize impacts in natural systems (e.g., agricultural soil use, mining for coal, construction sites, and exploration of petroleum and natural gas sources). |
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| THEME | MS.ENV. | Environmental Science |
| SUBJECT | | Human Activities and Climate Change |

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| STANDARD | ENV.3. | Students will discuss the direct and indirect impacts of certain types of human activities on the Earth's climate. |
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OBJECTIVE ENV.3.1. Use a model to describe cycling of carbon through the ocean, atmosphere, soil, and biosphere and how increases in carbon dioxide concentrations have resulted in atmospheric and climate changes.

OBJECTIVE ENV.3.2. Interpret data and climate models to predict how global and regional climate change can affect Earth's systems (e.g., precipitation, temperature, impacts on sea level, global ice volumes, and atmosphere and ocean composition).

OBJECTIVE ENV.3.4. Enrichment: Determine mathematically an individual's impact on the environment (carbon footprint, water usage, landfill contribution) and develop a plan to reduce personal contribution.

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| THEME | MS.ENV. | Environmental Science |
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| SUBJECT | | Human Sustainability |
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| STANDARD | ENV.4. | Students will demonstrate an understanding of the interdependence of human sustainability and the environment. |
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OBJECTIVE ENV.4.1. Identify human impact and develop a solution for protection of the atmosphere, considering pollutants (e.g., acid rain, air pollution, smog, ozone layer, or increased levels of greenhouse gases) and the impacts of pollutants on human health (e.g., asthma, COPD, emphysema, and cancer).

OBJECTIVE ENV.4.3. Enrichment: Research and analyze case studies to determine the impact of human-related and natural environmental changes on human health and communicate possible solutions to reduce/resolve the dilemma.

OBJECTIVE ENV.4.5. Enrichment: Use an engineering design process to define a problem, design, construct, evaluate, and improve a device or method to reduce or prevent human impact on a natural resource (e.g., build a water filter, design an air purifier, develop a method to prevent parking lot pollution from entering a watershed).

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| THEME | MS.FB. | Foundations of Biology |
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| SUBJECT | | History of Biology and Impacts on Society |
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| STANDARD | FB.1. | Students will relate the importance of significant historical biological experiments and their impact of these on research, development, and society. |
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OBJECTIVE FB.1.4. Enrichment: Research, analyze, explain, and communicate the influence of society, including cultural components, on the direction and progress of science and technology (e.g., medical treatments, emerging viruses, antibiotic resistance, vaccinations and re-emergent diseases, alternative energy development, and/or biomimicry).

Grade 12 - Adopted: 2017

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| THEME | MS.FSL. | Foundations of Science Literacy |
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| SUBJECT | | History of Science and Impacts on Society |
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| STANDARD | FSL.1. | Students will relate the importance of significant historical experiments and their impact on research and development. |
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OBJECTIVE FSL.1.2. Research, analyze, explain, and communicate how scientific enterprise relates to society and classic inventions (e.g., microscope, telescope, computer, and telephone).

OBJECTIVE FSL.1.3. Identify and communicate the impact of mathematics and technology in the development of scientific thought and the practice of science (e.g., space exploration, the human genome project, and ocean exploration).

OBJECTIVE FSL.1.4. Enrichment: Research, analyze, explain, and communicate the influence of society, including cultural components, on the direction and progress of science and technology (e.g., medical treatments, antibiotic resistance, alternative energy development, and biomimicry).

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| THEME | MS.FSL. | Foundations of Science Literacy |
| SUBJECT | | Nature of Technology and Engineering |
| STANDARD | FSL.2. | Students will identify, research, and communicate the development of technology and engineering practices. |

OBJECTIVE FSL.2.1. Research and present a technology that was developed through engineering design. Identify its purpose, how it has advanced through alterations in design (e.g., systems that provide homes and businesses with utilities, parking structures, park and recreational structures, and traffic flow), and careers related to its use).

OBJECTIVE FSL.2.2. Use an engineering design process to identify a problem within the local community, and propose and develop a possible solution for that problem.

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| THEME | MS.FSL. | Foundations of Science Literacy |
| SUBJECT | | Nature of Science |
| STANDARD | FSL.3B. | Students will apply scientific literacy and thinking skills to analyze and interpret data found in various graphics including, but not limited to, those found in sample ACT science passages. |

OBJECTIVE FSL.3B.5. Analyze presented information when given new information (e.g., given a new scenario, how would a given scenario be changed).

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| THEME | MS.FSL. | Foundations of Science Literacy |
| SUBJECT | | Nature of Science |
| STANDARD | FSL.3C. | Students will apply scientific literacy and thinking skills to analyze scientific investigations found in various experimental designs including, but not limited to, those found in sample ACT science passages. |

OBJECTIVE FSL.3C.1. Analyze the methods and choice of tools used in simple and complex experimental designs.

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| THEME | MS.PHS. | Physical Science |
| SUBJECT | | Electricity |
| STANDARD | PHS.9. | Students will explore basic principles of magnetism and electricity (e.g., static electricity, current electricity, and circuits). |

OBJECTIVE PHS.9.2. Distinguish between magnets, motors, and generators, and evaluate modern industrial uses of each.

OBJECTIVE PHS.9.3. Enrichment: Use an engineering design process to construct a working electric motor to perform a task. Communicate the design process and comparisons of task performance efficiencies.

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| THEME | MS.PHY. | Physics |
| SUBJECT | | Work and Energy |
| STANDARD | PHY.3. | Students will develop an understanding of concepts related to work and energy. |

OBJECTIVE PHY.3.11. Enrichment: Use an engineering design process to design and build a themed Rube Goldberg-type machine that has six or more steps and complete a desired task (e.g., pop a balloon, fill a bottle, shoot a projectile, or raise an object 35 cm) within an allotted time. Include a poster that demonstrates the calculations of the energy transformation or efficiency of the machine.

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| THEME | MS.PHY. | Physics |
| SUBJECT | | Electricity and Magnetism |

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| STANDARD | PHY.5. | Students will investigate the key components of electricity and magnetism. |
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| OBJECTIVE | PHY.5.1. | Analyze and explain electricity and the relationship between electricity and magnetism. |
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| OBJECTIVE | PHY.5.8. | Enrichment: Design and construct a simple motor to develop an explanation of how the motor transforms electrical energy into mechanical energy and work. |
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**Mississippi College & Career Readiness Standards
Technology Education
Grade 11 - Adopted: 2018**

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| THEME | | Mississippi College- and Career-Readiness Standards for Computer Science |
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| SUBJECT | | Level 3B: GRADES 11-12 - Algorithms and Programming |
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| STANDARD | AP.3B. | Algorithms and Programming (AP.3B) |
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| OBJECTIVE | AP.3B.2. | Implement an artificial intelligence algorithm to play a game against a human opponent or solve a problem. [ALGORITHMS] (P5.3) |
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| OBJECTIVE | AP.3B.3. | Use and adapt classic algorithms to solve computational problems. [ALGORITHMS] (P4.2) |
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| OBJECTIVE | AP.3B.8. | Analyze a large-scale computational problem and identify generalizable patterns that can be applied to a solution. [MODULARITY] (P4.1) |
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**Mississippi College & Career Readiness Standards
Technology Education
Grade 12 - Adopted: 2018**

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| THEME | | Mississippi College- and Career-Readiness Standards for Computer Science |
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| SUBJECT | | Level 3B: GRADES 11-12 - Algorithms and Programming |
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| STANDARD | AP.3B. | Algorithms and Programming (AP.3B) |
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| OBJECTIVE | AP.3B.2. | Implement an artificial intelligence algorithm to play a game against a human opponent or solve a problem. [ALGORITHMS] (P5.3) |
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| OBJECTIVE | AP.3B.3. | Use and adapt classic algorithms to solve computational problems. [ALGORITHMS] (P4.2) |
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| OBJECTIVE | AP.3B.8. | Analyze a large-scale computational problem and identify generalizable patterns that can be applied to a solution. [MODULARITY] (P4.1) |
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