Main Criteria: Forward Education
Secondary Criteria: Indiana Academic Standards
Subjects: Mathematics, Science, Technology Education
Grades: 11, 12, Key Stage 4

Forward Education

Autonomous Electric Vehicles of the Future

Indiana Academic Standards
Mathematics
Grade **11** - Adopted: **2023**

STANDARD / STRAND		**Mathematics Process Standards**
PROFICIENCY STATEMENT / SUBSTRAND	PS.1:	Make sense of problems and persevere in solving them.
PROFICIENCY STATEMENT / SUBSTRAND	PS.2:	Reason abstractly and quantitatively.
PROFICIENCY STATEMENT / SUBSTRAND	PS.3:	Construct viable arguments and critique the reasoning of others.
PROFICIENCY STATEMENT / SUBSTRAND	PS.4:	Model with mathematics.
PROFICIENCY STATEMENT / SUBSTRAND	PS.8:	Look for and express regularity in repeated reasoning.
STANDARD / STRAND		**Algebra I**
PROFICIENCY STATEMENT / SUBSTRAND		**Linear Equations, Inequalities, and Functions – Learning Outcome: Students represent real-world situations with linear functions and use these equations to solve problems.**
INDICATOR / STANDARD	AI.L.3.	Represent real-world problems that can be modeled with a linear function using equations, graphs, and tables, including with technology. Translate fluently among these representations and interpret the slope and intercepts. (E)
STANDARD / STRAND		**Algebra II**
PROFICIENCY STATEMENT / SUBSTRAND		**Function Families – Learning Outcome: Students represent nonlinear functions in a variety of forms, recognizing and applying key features based on the type of function.**
INDICATOR / STANDARD	**AII.FF.1.**	**Using technology, identify, create, and connect algebraic and graphical representations of each of the function families listed:**
EXPECTATION / INDICATOR	AII.FF.1.a.	Quadratic
STANDARD / STRAND		**Algebra II**

PROFICIENCY STATEMENT / SUBSTRAND		**Function Families – Learning Outcome: Students represent nonlinear functions in a variety of forms, recognizing and applying key features based on the type of function.**
INDICATOR / STANDARD	AII.FF.2.	Graph each of the families of function with and without technology. Identify and describe key features, such as intercepts, domain and range, asymptotes, symmetry, and end behavior. Create inverse functions algebraically and/or graphically based on a given function. Model real-world situations with each function family. (E)
STANDARD / STRAND		**Algebra II**
PROFICIENCY STATEMENT / SUBSTRAND		**Modeling with Functions and Data – Learning Outcome: Students use families of functions to model real-world situations using multiple mathematical representations.**
INDICATOR / STANDARD	AII.MFD.2.	Represent real-world problems that can be modeled by linear, quadratic, exponential, and rational functions using tables, graphs, and equations. Use technology to represent the functional relationships and translate and interpret different forms (e.g., vertex form of a quadratic, intercepts, end behavior) with respect to the context. (E)
STANDARD / STRAND		**Analytical Algebra II**
PROFICIENCY STATEMENT / SUBSTRAND		**Function Families – Learning Outcome: Students represent nonlinear functions in a variety of forms, recognizing and applying key features based on the type of function.**
INDICATOR / STANDARD	AAII.FF.2.	Graph each of the families of function with and without technology. Identify and describe key features, such as intercepts, domain and range, asymptotes, symmetry, and end behavior. Create inverse functions algebraically and/or graphically based on a given function.
STANDARD / STRAND		**Analytical Algebra II**
PROFICIENCY STATEMENT / SUBSTRAND		**Modeling with Functions and Data – Learning Outcome: Students represent real-world situations with linear and nonlinear functions, and use these equations to solve problems.**
INDICATOR / STANDARD	AAII.MFD.2.	Represent real-world problems that can be modeled by linear, quadratic, exponential, and rational functions using tables, graphs, and equations. Use technology to represent the functional relationships and translate and interpret different forms (e.g., vertex form of a quadratic, intercepts, end behavior) with respect to the context. (E)

Grade **11** - Adopted: **2020**

STANDARD / STRAND		**Calculus**
PROFICIENCY STATEMENT / SUBSTRAND		**Process Standards for Mathematics**
INDICATOR / STANDARD	PS.1	Make sense of problems and persevere in solving them.
INDICATOR / STANDARD	PS.2	Reason abstractly and quantitatively.
INDICATOR / STANDARD	PS.3	Construct viable arguments and critique the reasoning of others.
INDICATOR / STANDARD	PS.4	Model with mathematics.

INDICATOR / STANDARD	PS.8	Look for and express regularity in repeated reasoning.
STANDARD / STRAND		**Finite Mathematics**
PROFICIENCY STATEMENT / SUBSTRAND		**Process Standards for Mathematics**
INDICATOR / STANDARD	PS.1	Make sense of problems and persevere in solving them.
INDICATOR / STANDARD	PS.2	Reason abstractly and quantitatively.
INDICATOR / STANDARD	PS.3	Construct viable arguments and critique the reasoning of others.
INDICATOR / STANDARD	PS.4	Model with mathematics.
INDICATOR / STANDARD	PS.8	Look for and express regularity in repeated reasoning.
STANDARD / STRAND		**Precalculus: Algebra**
PROFICIENCY STATEMENT / SUBSTRAND		**Process Standards for Mathematics**
INDICATOR / STANDARD	PS.1	Make sense of problems and persevere in solving them.
INDICATOR / STANDARD	PS.2	Reason abstractly and quantitatively.
INDICATOR / STANDARD	PS.3	Construct viable arguments and critique the reasoning of others.
INDICATOR / STANDARD	PS.4	Model with mathematics.
INDICATOR / STANDARD	PS.8	Look for and express regularity in repeated reasoning.
STANDARD / STRAND		**Precalculus: Trigonometry**
PROFICIENCY STATEMENT / SUBSTRAND		**Process Standards for Mathematics**
INDICATOR / STANDARD	PS.1	Make sense of problems and persevere in solving them.

INDICATOR / STANDARD	PS.2	Reason abstractly and quantitatively.
INDICATOR / STANDARD	PS.3	Construct viable arguments and critique the reasoning of others.
INDICATOR / STANDARD	PS.4	Model with mathematics.
INDICATOR / STANDARD	PS.8	Look for and express regularity in repeated reasoning.
STANDARD / STRAND		**Probability and Statistics**
PROFICIENCY STATEMENT / SUBSTRAND		**Process Standards for Mathematics**
INDICATOR / STANDARD	PS.1	Make sense of problems and persevere in solving them.
INDICATOR / STANDARD	PS.2	Reason abstractly and quantitatively.
INDICATOR / STANDARD	PS.3	Construct viable arguments and critique the reasoning of others.
INDICATOR / STANDARD	PS.4	Model with mathematics.
INDICATOR / STANDARD	PS.8	Look for and express regularity in repeated reasoning.
STANDARD / STRAND		**Quantitative Reasoning**
PROFICIENCY STATEMENT / SUBSTRAND		**Process Standards for Mathematics**
INDICATOR / STANDARD	PS.1	Make sense of problems and persevere in solving them.
INDICATOR / STANDARD	PS.2	Reason abstractly and quantitatively.
INDICATOR / STANDARD	PS.3	Construct viable arguments and critique the reasoning of others.
INDICATOR / STANDARD	PS.4	Model with mathematics.
INDICATOR / STANDARD	PS.8	Look for and express regularity in repeated reasoning.

Indiana Academic Standards

Mathematics

Grade **12** - Adopted: **2023**

STANDARD / STRAND		Mathematics Process Standards
PROFICIENCY STATEMENT / SUBSTRAND	PS.1:	Make sense of problems and persevere in solving them.
PROFICIENCY STATEMENT / SUBSTRAND	PS.2:	Reason abstractly and quantitatively.
PROFICIENCY STATEMENT / SUBSTRAND	PS.3:	Construct viable arguments and critique the reasoning of others.
PROFICIENCY STATEMENT / SUBSTRAND	PS.4:	Model with mathematics.
PROFICIENCY STATEMENT / SUBSTRAND	PS.8:	Look for and express regularity in repeated reasoning.

STANDARD / STRAND		Algebra I
PROFICIENCY STATEMENT / SUBSTRAND		**Linear Equations, Inequalities, and Functions – Learning Outcome: Students represent real-world situations with linear functions and use these equations to solve problems.**
INDICATOR / STANDARD	AI.L.3.	Represent real-world problems that can be modeled with a linear function using equations, graphs, and tables, including with technology. Translate fluently among these representations and interpret the slope and intercepts. (E)

STANDARD / STRAND		Algebra II
PROFICIENCY STATEMENT / SUBSTRAND		**Function Families – Learning Outcome: Students represent nonlinear functions in a variety of forms, recognizing and applying key features based on the type of function.**
INDICATOR / STANDARD	**AII.FF.1.**	**Using technology, identify, create, and connect algebraic and graphical representations of each of the function families listed:**
EXPECTATION / INDICATOR	AII.FF.1.a.	Quadratic

STANDARD / STRAND		Algebra II
PROFICIENCY STATEMENT / SUBSTRAND		**Function Families – Learning Outcome: Students represent nonlinear functions in a variety of forms, recognizing and applying key features based on the type of function.**
INDICATOR / STANDARD	AII.FF.2.	Graph each of the families of function with and without technology. Identify and describe key features, such as intercepts, domain and range, asymptotes, symmetry, and end behavior. Create inverse functions algebraically and/or graphically based on a given function. Model real-world situations with each function family. (E)

STANDARD / STRAND		**Algebra II**
PROFICIENCY STATEMENT / SUBSTRAND		**Modeling with Functions and Data – Learning Outcome: Students use families of functions to model real-world situations using multiple mathematical representations.**
INDICATOR / STANDARD	AII.MFD.2.	Represent real-world problems that can be modeled by linear, quadratic, exponential, and rational functions using tables, graphs, and equations. Use technology to represent the functional relationships and translate and interpret different forms (e.g., vertex form of a quadratic, intercepts, end behavior) with respect to the context. (E)

STANDARD / STRAND		**Analytical Algebra II**
PROFICIENCY STATEMENT / SUBSTRAND		**Function Families – Learning Outcome: Students represent nonlinear functions in a variety of forms, recognizing and applying key features based on the type of function.**
INDICATOR / STANDARD	AAII.FF.2.	Graph each of the families of function with and without technology. Identify and describe key features, such as intercepts, domain and range, asymptotes, symmetry, and end behavior. Create inverse functions algebraically and/or graphically based on a given function.

STANDARD / STRAND		**Analytical Algebra II**
PROFICIENCY STATEMENT / SUBSTRAND		**Modeling with Functions and Data – Learning Outcome: Students represent real-world situations with linear and nonlinear functions, and use these equations to solve problems.**
INDICATOR / STANDARD	AAII.MFD.2.	Represent real-world problems that can be modeled by linear, quadratic, exponential, and rational functions using tables, graphs, and equations. Use technology to represent the functional relationships and translate and interpret different forms (e.g., vertex form of a quadratic, intercepts, end behavior) with respect to the context. (E)

Grade **12** - Adopted: **2020**

STANDARD / STRAND		**Calculus**
PROFICIENCY STATEMENT / SUBSTRAND		**Process Standards for Mathematics**
INDICATOR / STANDARD	PS.1	Make sense of problems and persevere in solving them.
INDICATOR / STANDARD	PS.2	Reason abstractly and quantitatively.
INDICATOR / STANDARD	PS.3	Construct viable arguments and critique the reasoning of others.
INDICATOR / STANDARD	PS.4	Model with mathematics.
INDICATOR / STANDARD	PS.8	Look for and express regularity in repeated reasoning.

STANDARD / STRAND		**Finite Mathematics**

PROFICIENCY STATEMENT / SUBSTRAND		**Process Standards for Mathematics**
INDICATOR / STANDARD	PS.1	Make sense of problems and persevere in solving them.
INDICATOR / STANDARD	PS.2	Reason abstractly and quantitatively.
INDICATOR / STANDARD	PS.3	Construct viable arguments and critique the reasoning of others.
INDICATOR / STANDARD	PS.4	Model with mathematics.
INDICATOR / STANDARD	PS.8	Look for and express regularity in repeated reasoning.
STANDARD / STRAND		**Precalculus: Algebra**
PROFICIENCY STATEMENT / SUBSTRAND		**Process Standards for Mathematics**
INDICATOR / STANDARD	PS.1	Make sense of problems and persevere in solving them.
INDICATOR / STANDARD	PS.2	Reason abstractly and quantitatively.
INDICATOR / STANDARD	PS.3	Construct viable arguments and critique the reasoning of others.
INDICATOR / STANDARD	PS.4	Model with mathematics.
INDICATOR / STANDARD	PS.8	Look for and express regularity in repeated reasoning.
STANDARD / STRAND		**Precalculus: Trigonometry**
PROFICIENCY STATEMENT / SUBSTRAND		**Process Standards for Mathematics**
INDICATOR / STANDARD	PS.1	Make sense of problems and persevere in solving them.
INDICATOR / STANDARD	PS.2	Reason abstractly and quantitatively.
INDICATOR / STANDARD	PS.3	Construct viable arguments and critique the reasoning of others.

INDICATOR / STANDARD	PS.4	Model with mathematics.
INDICATOR / STANDARD	PS.8	Look for and express regularity in repeated reasoning.
STANDARD / STRAND		**Probability and Statistics**
PROFICIENCY STATEMENT / SUBSTRAND		**Process Standards for Mathematics**
INDICATOR / STANDARD	PS.1	Make sense of problems and persevere in solving them.
INDICATOR / STANDARD	PS.2	Reason abstractly and quantitatively.
INDICATOR / STANDARD	PS.3	Construct viable arguments and critique the reasoning of others.
INDICATOR / STANDARD	PS.4	Model with mathematics.
INDICATOR / STANDARD	PS.8	Look for and express regularity in repeated reasoning.
STANDARD / STRAND		**Quantitative Reasoning**
PROFICIENCY STATEMENT / SUBSTRAND		**Process Standards for Mathematics**
INDICATOR / STANDARD	PS.1	Make sense of problems and persevere in solving them.
INDICATOR / STANDARD	PS.2	Reason abstractly and quantitatively.
INDICATOR / STANDARD	PS.3	Construct viable arguments and critique the reasoning of others.
INDICATOR / STANDARD	PS.4	Model with mathematics.
INDICATOR / STANDARD	PS.8	Look for and express regularity in repeated reasoning.

Indiana Academic Standards

Science

Grade **11** - Adopted: **2023**

STANDARD / STRAND		**Science and Engineering Practices**

PROFICIENCY STATEMENT / SUBSTRAND	SEP.2.	Developing and using models
PROFICIENCY STATEMENT / SUBSTRAND	SEP.6.	Constructing explanations (for science) and designing solutions (for engineering)
PROFICIENCY STATEMENT / SUBSTRAND	SEP.8.	Obtaining, evaluating, and communicating information
STANDARD / STRAND		**Biology**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-LS2-7.**	**Ecosystems: Interactions, Energy and Dynamics**
INDICATOR / STANDARD	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
STANDARD / STRAND		**Chemistry**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-PS1-4.**	**Matter and Its Interactions**
INDICATOR / STANDARD	HS-PS1-4.	Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.
STANDARD / STRAND		**Earth and Space Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ESS2-4.**	**Earth's Systems**
INDICATOR / STANDARD	HS-ESS2-4.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
STANDARD / STRAND		**Earth and Space Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ESS3-1.**	**Human Interaction with Earth's Systems**
INDICATOR / STANDARD	HS-ESS3-1.	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
STANDARD / STRAND		**Earth and Space Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ESS3-2.**	**Human Interaction with Earth's Systems**
INDICATOR / STANDARD	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.

STANDARD / STRAND		**Earth and Space Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ESS3-3.**	**Human Interaction with Earth's Systems**
INDICATOR / STANDARD	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.

STANDARD / STRAND		**Earth and Space Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ESS3-4.**	**Human Interaction with Earth's Systems**
INDICATOR / STANDARD	HS-ESS3-4.	Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.

STANDARD / STRAND		**Earth and Space Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ESS3-6.**	**Human Interaction with Earth's Systems**
INDICATOR / STANDARD	HS-ESS3-6.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

Grade **11** - Adopted: **2022**

STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV1-3.**	**Environmental Systems**
INDICATOR / STANDARD	HS-ENV1-3.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV2-3.**	**Flow of Matter and Energy**
INDICATOR / STANDARD	HS-ENV2-3.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.

STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV2-4.**	**Flow of Matter and Energy**
INDICATOR / STANDARD	HS-ENV2-4.	Analyze and interpret the data on the benefits and disadvantages of the different sources of energy including fossil fuels, nuclear energy, hydroelectric, wind, solar, geothermal and biofuels.

STANDARD / STRAND		**Environmental Science**

PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV2-5.**	**Flow of Matter and Energy**
INDICATOR / STANDARD	HS-ENV2-5.	Use a model or simulation to analyze how layers of energy-rich organic material have been gradually turned into great coal beds and oil pools by the pressure of the overlying earth. Observe that by burning these fossil fuels, people are passing stored energy back into the environment as heat and releasing large amounts of matter such as carbon dioxide and other air pollutants.
STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV2-6.**	**Flow of Matter and Energy**
INDICATOR / STANDARD	HS-ENV2-6.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV4-2.**	**Biodiversity**
INDICATOR / STANDARD	HS-ENV4-2.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV5-2.**	**The Effect of Human Population and Activities on the Environment**
INDICATOR / STANDARD	HS-ENV5-2.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV5-3.**	**The Effect of Human Population and Activities on the Environment**
INDICATOR / STANDARD	HS-ENV5-3.	Design, evaluate and refine a technological solution that reduces impacts of human activities on natural systems.
STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV5-4.**	**The Effect of Human Population and Activities on the Environment**
INDICATOR / STANDARD	HS-ENV5-4.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

Grade **11** - Adopted: **2023**

STANDARD / STRAND		**Integrated Chemistry and Physics**

PROFICIENCY STATEMENT / SUBSTRAND	**HS-ICP1-4.**	**Matter and its Interactions**
INDICATOR / STANDARD	HS-ICP1-4.	Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.
STANDARD / STRAND		**Integrated Chemistry and Physics**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ICP3-3.**	**Energy**
INDICATOR / STANDARD	HS-ICP3-3.	Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.
STANDARD / STRAND		**Physics I**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-PS3-3.**	**Energy**
INDICATOR / STANDARD	HS-PS3-3.	Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.

Grade **11** - Adopted: **2022**

STANDARD / STRAND		**Physics II**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-PSII-6.**	**Magnetism**
INDICATOR / STANDARD	HS-PSII-6.5.	Describe the practical uses of magnetism in motors, electronic devices, mass spectroscopy, MRIs, and other applications.

Indiana Academic Standards

Science

Grade **12** - Adopted: **2023**

STANDARD / STRAND		**Science and Engineering Practices**
PROFICIENCY STATEMENT / SUBSTRAND	SEP.2.	Developing and using models
PROFICIENCY STATEMENT / SUBSTRAND	SEP.6.	Constructing explanations (for science) and designing solutions (for engineering)
PROFICIENCY STATEMENT / SUBSTRAND	SEP.8.	Obtaining, evaluating, and communicating information
STANDARD / STRAND		**Biology**

PROFICIENCY STATEMENT / SUBSTRAND	**HS-LS2-7.**	**Ecosystems: Interactions, Energy and Dynamics**
INDICATOR / STANDARD	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
STANDARD / STRAND		**Chemistry**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-PS1-4.**	**Matter and Its Interactions**
INDICATOR / STANDARD	HS-PS1-4.	Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.
STANDARD / STRAND		**Earth and Space Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ESS2-4.**	**Earth's Systems**
INDICATOR / STANDARD	HS-ESS2-4.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
STANDARD / STRAND		**Earth and Space Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ESS3-1.**	**Human Interaction with Earth's Systems**
INDICATOR / STANDARD	HS-ESS3-1.	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
STANDARD / STRAND		**Earth and Space Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ESS3-2.**	**Human Interaction with Earth's Systems**
INDICATOR / STANDARD	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
STANDARD / STRAND		**Earth and Space Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ESS3-3.**	**Human Interaction with Earth's Systems**
INDICATOR / STANDARD	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
STANDARD / STRAND		**Earth and Space Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ESS3-4.**	**Human Interaction with Earth's Systems**

INDICATOR / STANDARD	HS-ESS3-4.	Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.

STANDARD / STRAND		**Earth and Space Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ESS3-6.**	**Human Interaction with Earth's Systems**
INDICATOR / STANDARD	HS-ESS3-6.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

Grade **12** - Adopted: **2022**

STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV1-3.**	**Environmental Systems**
INDICATOR / STANDARD	HS-ENV1-3.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV2-3.**	**Flow of Matter and Energy**
INDICATOR / STANDARD	HS-ENV2-3.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.

STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV2-4.**	**Flow of Matter and Energy**
INDICATOR / STANDARD	HS-ENV2-4.	Analyze and interpret the data on the benefits and disadvantages of the different sources of energy including fossil fuels, nuclear energy, hydroelectric, wind, solar, geothermal and biofuels.

STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV2-5.**	**Flow of Matter and Energy**
INDICATOR / STANDARD	HS-ENV2-5.	Use a model or simulation to analyze how layers of energy-rich organic material have been gradually turned into great coal beds and oil pools by the pressure of the overlying earth. Observe that by burning these fossil fuels, people are passing stored energy back into the environment as heat and releasing large amounts of matter such as carbon dioxide and other air pollutants.

STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV2-6.**	**Flow of Matter and Energy**

INDICATOR / STANDARD	HS-ENV2-6.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.

STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV4-2.**	**Biodiversity**
INDICATOR / STANDARD	HS-ENV4-2.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV5-2.**	**The Effect of Human Population and Activities on the Environment**
INDICATOR / STANDARD	HS-ENV5-2.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.

STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV5-3.**	**The Effect of Human Population and Activities on the Environment**
INDICATOR / STANDARD	HS-ENV5-3.	Design, evaluate and refine a technological solution that reduces impacts of human activities on natural systems.

STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV5-4.**	**The Effect of Human Population and Activities on the Environment**
INDICATOR / STANDARD	HS-ENV5-4.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

Grade **12** - Adopted: **2023**

STANDARD / STRAND		**Integrated Chemistry and Physics**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ICP1-4.**	**Matter and its Interactions**
INDICATOR / STANDARD	HS-ICP1-4.	Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.

STANDARD / STRAND		**Integrated Chemistry and Physics**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ICP3-3.**	**Energy**

INDICATOR / STANDARD	HS-ICP3-3.	Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.

STANDARD / STRAND		**Physics I**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-PS3-3.**	**Energy**
INDICATOR / STANDARD	HS-PS3-3.	Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.

Grade **12** - Adopted: **2022**

STANDARD / STRAND		**Physics II**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-PSII-6.**	**Magnetism**
INDICATOR / STANDARD	HS-PSII-6.5.	Describe the practical uses of magnetism in motors, electronic devices, mass spectroscopy, MRIs, and other applications.

Indiana Academic Standards

Technology Education

Grade **11** - Adopted: **2018**

STANDARD / STRAND		**Computer Science I**
PROFICIENCY STATEMENT / SUBSTRAND		**Programs and Algorithms (PA)**
INDICATOR / STANDARD	CSI-1.2.	Outline the problem assigned and describe the solution.
INDICATOR / STANDARD	CSI-1.3.	Use puzzles and games to enhance problem solving skills.
INDICATOR / STANDARD	CSI-3.1.	Develop algorithms to determine a solution.
INDICATOR / STANDARD	CSI-3.2.	Assess the use of algorithms to provide a solution.
INDICATOR / STANDARD	CSI-3.3.	Use pseudocode to describe a solution.
INDICATOR / STANDARD	CSI-3.5.	Explain how the algorithm can be used to solve a problem.
INDICATOR / STANDARD	CSI-4.2.	Create a computer program that corresponds to an algorithm or proposed solution.

STANDARD / STRAND		**Computer Science I**

PROFICIENCY STATEMENT / SUBSTRAND		**Networking and Communication (NC)**
INDICATOR / STANDARD	CSI-2.3.	Utilize a problem solving approach to develop a solution using technology.
INDICATOR / STANDARD	CSI-2.5.	Program a solution to a problem using pair programming or other methods.
STANDARD / STRAND		**Computer Science II**
PROFICIENCY STATEMENT / SUBSTRAND		**Programs and Algorithms (PA)**
INDICATOR / STANDARD	CSII-3.1.	Develop algorithms to determine a solution.
INDICATOR / STANDARD	CSII-3.5.	Explain how the algorithm can be used to solve a problem.
STANDARD / STRAND		**Computer Science II**
PROFICIENCY STATEMENT / SUBSTRAND		**Networking and Communication (NC)**
INDICATOR / STANDARD	CSII-2.1.	Design a solution to a problem by working in a team.
INDICATOR / STANDARD	CSII-2.3.	Utilize a problem solving approach to develop a solution using technology.
STANDARD / STRAND		**Introduction to Computer Science**
PROFICIENCY STATEMENT / SUBSTRAND		**Data and Information (DI)**
INDICATOR / STANDARD	ICS-2.5.	Formulate algorithms using programming structures to decompose a complex problem.
INDICATOR / STANDARD	ICS-5.3.	Utilize a problem solving approach to develop a solution using technology.
STANDARD / STRAND		**Introduction to Computer Science**
PROFICIENCY STATEMENT / SUBSTRAND		**Computing Devices and Systems (CD)**
INDICATOR / STANDARD	ICS-4.6.	Investigate innovations in computing, including robotics.

STANDARD / STRAND		**Computer Science III: Cybersecurity**
PROFICIENCY STATEMENT / SUBSTRAND		**Secure Coding Concepts**
INDICATOR / STANDARD	CS3S-1.2	Describe and discuss key concepts in cybersecurity, including cryptology, cryptography, cryptanalysis, cipher, cryptographic algorithm, private and public key encryption, public key infrastructure, and trust/trustworthiness.

STANDARD / STRAND		**Computer Science III: Cybersecurity**
PROFICIENCY STATEMENT / SUBSTRAND		**Secure Programming**
INDICATOR / STANDARD	CS3S-5.2	Develop Secure Software Development Lifecycle.

STANDARD / STRAND		**Computer Science III: Databases**
PROFICIENCY STATEMENT / SUBSTRAND		**Structured Query Language (SQL)**
INDICATOR / STANDARD	CS2D-4.4	Implement keys and constraints to ensure data and referential integrity

STANDARD / STRAND		**Computer Science III: Informatics**
PROFICIENCY STATEMENT / SUBSTRAND		**Trends in Computing**
INDICATOR / STANDARD	CS2I-2.7	Explain advanced machine learning and construction of algorithms that can learn from and make predictions on data

STANDARD / STRAND		**Computer Science III: Software Development**
PROFICIENCY STATEMENT / SUBSTRAND		**Team Management and Collaboration**
INDICATOR / STANDARD	CSIII-2.1	Design a solution to a problem by working in a team.
INDICATOR / STANDARD	CSIII-2.3	Utilize a problem solving approach to develop a solution using technology.

STANDARD / STRAND		**Computer Science III: Software Development**
PROFICIENCY STATEMENT / SUBSTRAND		**Project Management and Metrics**
INDICATOR / STANDARD	CSIII-3.2	Develop requirements analysis and specification for project goals.

Indiana Academic Standards

Technology Education

Grade **12** - Adopted: **2018**

STANDARD / STRAND		**Computer Science I**
PROFICIENCY STATEMENT / SUBSTRAND		**Programs and Algorithms (PA)**
INDICATOR / STANDARD	CSI-1.2.	Outline the problem assigned and describe the solution.
INDICATOR / STANDARD	CSI-1.3.	Use puzzles and games to enhance problem solving skills.
INDICATOR / STANDARD	CSI-3.1.	Develop algorithms to determine a solution.
INDICATOR / STANDARD	CSI-3.2.	Assess the use of algorithms to provide a solution.
INDICATOR / STANDARD	CSI-3.3.	Use pseudocode to describe a solution.
INDICATOR / STANDARD	CSI-3.5.	Explain how the algorithm can be used to solve a problem.
INDICATOR / STANDARD	CSI-4.2.	Create a computer program that corresponds to an algorithm or proposed solution.
STANDARD / STRAND		**Computer Science I**
PROFICIENCY STATEMENT / SUBSTRAND		**Networking and Communication (NC)**
INDICATOR / STANDARD	CSI-2.3.	Utilize a problem solving approach to develop a solution using technology.
INDICATOR / STANDARD	CSI-2.5.	Program a solution to a problem using pair programming or other methods.
STANDARD / STRAND		**Computer Science II**
PROFICIENCY STATEMENT / SUBSTRAND		**Programs and Algorithms (PA)**
INDICATOR / STANDARD	CSII-3.1.	Develop algorithms to determine a solution.
INDICATOR / STANDARD	CSII-3.5.	Explain how the algorithm can be used to solve a problem.

STANDARD / STRAND		**Computer Science II**
PROFICIENCY STATEMENT / SUBSTRAND		**Networking and Communication (NC)**
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INDICATOR / STANDARD	CSII-2.3.	Utilize a problem solving approach to develop a solution using technology.
STANDARD / STRAND		**Introduction to Computer Science**
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