Forward Education

Autonomous Electric Vehicles of the Future

Oklahoma Academic Standards
Mathematics
Grade **11** - Adopted: **2022**

CONTENT STANDARD / COURSE	Mathematical Actions and Processes	
STRAND / STANDARD	Develop Accurate and Appropriate Procedural Fluency	
STRAND / STANDARD	Develop Strategies for Problem Solving	
STRAND / STANDARD	Develop Mathematical Reasoning	
STRAND / STANDARD	Develop the Ability to Make Conjectures, Model, and Generalize	
STRAND / STANDARD	Develop the Ability to Communicate Mathematically	

CONTENT STANDARD / COURSE	PA.	Pre-Algebra (PA)
STRAND / STANDARD	PA.A.	Algebraic Reasoning & Algebra (A)
OBJECTIVE	PA.A.1.	Explain the concept of function in mathematical situations and distinguish between the concepts of linear and nonlinear functions.
SKILL / CONCEPT	PA.A.1.2.	Use linear functions to represent and model mathematical situations.

CONTENT STANDARD / COURSE	PA.	Pre-Algebra (PA)
STRAND / STANDARD	PA.A.	Algebraic Reasoning & Algebra (A)
OBJECTIVE	PA.A.2.	Identify and justify linear functions using mathematical models and situations; solve problems involving linear functions and interpret results in the original context.
SKILL / CONCEPT	PA.A.2.2.	Identify, describe, and analyze linear relationships between two variables.
SKILL / CONCEPT	PA.A.2.5.	Solve problems involving linear functions and interpret results in the original context.

CONTENT STANDARD / COURSE	A1.	Algebra 1 (A1)
STRAND / STANDARD	A1.A.	Algebraic Reasoning & Algebra (A)
OBJECTIVE	A1.A.4.	Analyze real-world and mathematical problems involving linear equations.
SKILL / CONCEPT	A1.A.4.3.	Write the equation of the line given its slope and y-intercept, slope and one point, two points, x- and y-intercepts, or a set of data points.
SKILL / CONCEPT	A1.A.4.4.	Express linear equations in slope-intercept, point-slope, and standard forms. Convert between these forms.
SKILL / CONCEPT	A1.A.4.5.	Analyze and interpret associations between graphical representations and written scenarios.

Oklahoma Academic Standards
Mathematics
Grade **12** - Adopted: **2022**

CONTENT STANDARD / COURSE		Mathematical Actions and Processes
STRAND / STANDARD		Develop Accurate and Appropriate Procedural Fluency
STRAND / STANDARD		Develop Strategies for Problem Solving
STRAND / STANDARD		Develop Mathematical Reasoning
STRAND / STANDARD		Develop the Ability to Make Conjectures, Model, and Generalize
STRAND / STANDARD		Develop the Ability to Communicate Mathematically

CONTENT STANDARD / COURSE	PA.	Pre-Algebra (PA)
STRAND / STANDARD	PA.A.	Algebraic Reasoning & Algebra (A)
OBJECTIVE	PA.A.1.	Explain the concept of function in mathematical situations and distinguish between the concepts of linear and nonlinear functions.
SKILL / CONCEPT	PA.A.1.2.	Use linear functions to represent and model mathematical situations.

CONTENT STANDARD / COURSE	PA.	Pre-Algebra (PA)
STRAND / STANDARD	PA.A.	Algebraic Reasoning & Algebra (A)

OBJECTIVE	**PA.A.2.**	**Identify and justify linear functions using mathematical models and situations; solve problems involving linear functions and interpret results in the original context.**
SKILL / CONCEPT	PA.A.2.2.	Identify, describe, and analyze linear relationships between two variables.
SKILL / CONCEPT	PA.A.2.5.	Solve problems involving linear functions and interpret results in the original context.

CONTENT STANDARD / COURSE	**A1.**	**Algebra 1 (A1)**
STRAND / STANDARD	**A1.A.**	**Algebraic Reasoning & Algebra (A)**
OBJECTIVE	**A1.A.4.**	**Analyze real-world and mathematical problems involving linear equations.**
SKILL / CONCEPT	A1.A.4.3.	Write the equation of the line given its slope and y-intercept, slope and one point, two points, x- and y-intercepts, or a set of data points.
SKILL / CONCEPT	A1.A.4.4.	Express linear equations in slope-intercept, point-slope, and standard forms. Convert between these forms.
SKILL / CONCEPT	A1.A.4.5.	Analyze and interpret associations between graphical representations and written scenarios.

Oklahoma Academic Standards
Science
Grade **11** - Adopted: **2020**

CONTENT STANDARD / COURSE		**Oklahoma Academic Standards for Science**
STRAND / STANDARD		**PHYSICAL SCIENCE (PS)**
OBJECTIVE		**Energy (PS3)**
SKILL / CONCEPT	PS.PS3.3	Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.

CONTENT STANDARD / COURSE		**Oklahoma Academic Standards for Science**
STRAND / STANDARD		**PHYSICAL SCIENCE (PS)**
OBJECTIVE		**Waves and Their Applications in Technologies for Information Transfer (PS4)**
SKILL / CONCEPT	PS.PS4.2	Evaluate questions about the advantages and disadvantages of using a digital transmission and storage of information.

CONTENT STANDARD / COURSE		**Oklahoma Academic Standards for Science**
STRAND / STANDARD		**CHEMISTRY (CH)**
OBJECTIVE		**Matter and Its Interactions (PS1)**

SKILL / CONCEPT	CH.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.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards for Science
STRAND / STANDARD		CHEMISTRY (CH)
OBJECTIVE		Energy (PS3)

SKILL / CONCEPT	CH.PS3.3	Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards for Science
STRAND / STANDARD		PHYSICS (PH)
OBJECTIVE		Energy (PS3)

SKILL / CONCEPT	PH.PS3.3	Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards for Science
STRAND / STANDARD		PHYSICS (PH)
OBJECTIVE		Waves and Their Applications in Technologies for Information Transfer (PS4)

SKILL / CONCEPT	PH.PS4.2	Evaluate questions about the advantages and disadvantages of using digital transmission and storage of information.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards for Science
STRAND / STANDARD		EARTH AND SPACE SCIENCE (ES)
OBJECTIVE		Earth Systems (ESS2)

SKILL / CONCEPT	ES.ESS2.4	Analyze and interpret data to explore how variations in the flow of energy into and out of Earth's systems causes changes to the atmosphere and climate.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards for Science
STRAND / STANDARD		EARTH AND SPACE SCIENCE (ES)
OBJECTIVE		Earth and Human Activities (ESS3)

SKILL / CONCEPT	ES.ESS3.1	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate effect human activity.

SKILL / CONCEPT	ES.ESS3. 2	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios on large and small scales.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards for Science
STRAND / STANDARD		ENVIRONMENTAL SCIENCE (EN)
OBJECTIVE		Ecosystems: Interactions, Energy, and Dynamics (LS2)

SKILL / CONCEPT	EN.LS2.7	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards for Science
STRAND / STANDARD		ENVIRONMENTAL SCIENCE (EN)
OBJECTIVE		Earth Systems (ESS2)

SKILL / CONCEPT	EN.ESS2. 4	Analyze and interpret data to explore how variations in the flow of energy into and out of Earth's systems causes changes to the atmosphere and climate.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards for Science
STRAND / STANDARD		ENVIRONMENTAL SCIENCE (EN)
OBJECTIVE		Earth and Human Activities (ESS3)

SKILL / CONCEPT	EN.ESS3. 1	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate effect human activity.
SKILL / CONCEPT	EN.ESS3. 2	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios on large and small scales.
SKILL / CONCEPT	EN.ESS3. 3	Use computational simulations to illustrate changes between the relationships of natural resources, human populations, and biodiversity and their sustainability within Earth systems.
SKILL / CONCEPT	EN.ESS3. 4	Evaluate design solutions for a major global or local environmental problem that reduces or stabilizes the impacts of human activities on natural systems.

Oklahoma Academic Standards
Science
Grade **12** - Adopted: **2020**

CONTENT STANDARD / COURSE		Oklahoma Academic Standards for Science
STRAND / STANDARD		PHYSICAL SCIENCE (PS)
OBJECTIVE		Energy (PS3)

SKILL / CONCEPT	PS.PS3.3	Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.

CONTENT STANDARD / COURSE	Oklahoma Academic Standards for Science	
STRAND / STANDARD		PHYSICAL SCIENCE (PS)
OBJECTIVE		Waves and Their Applications in Technologies for Information Transfer (PS4)

SKILL / CONCEPT	PS.PS4.2	Evaluate questions about the advantages and disadvantages of using a digital transmission and storage of information.

CONTENT STANDARD / COURSE	Oklahoma Academic Standards for Science	
STRAND / STANDARD		CHEMISTRY (CH)
OBJECTIVE		Matter and Its Interactions (PS1)

SKILL / CONCEPT	CH.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.

CONTENT STANDARD / COURSE	Oklahoma Academic Standards for Science	
STRAND / STANDARD		CHEMISTRY (CH)
OBJECTIVE		Energy (PS3)

SKILL / CONCEPT	CH.PS3.3	Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.

CONTENT STANDARD / COURSE	Oklahoma Academic Standards for Science	
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OBJECTIVE		Energy (PS3)

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CONTENT STANDARD / COURSE		Oklahoma Academic Standards for Science
STRAND / STANDARD		EARTH AND SPACE SCIENCE (ES)
OBJECTIVE		Earth Systems (ESS2)

SKILL / CONCEPT	ES.ESS2. 4	Analyze and interpret data to explore how variations in the flow of energy into and out of Earth's systems causes changes to the atmosphere and climate.

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SKILL / CONCEPT	EN.ESS3. 4	Evaluate design solutions for a major global or local environmental problem that reduces or stabilizes the impacts of human activities on natural systems.

Oklahoma Academic Standards
Technology Education
Grade **11** - Adopted: **2023**

CONTENT STANDARD / COURSE		Oklahoma Academic Standards - Computer Science
STRAND / STANDARD		Computer Science Practices
OBJECTIVE		Creating Computational Artifacts

SKILL / CONCEPT	Develop computational artifacts to create prototypes and solve computational problems. Students create artifacts that are personally relevant or beneficial to the community and beyond. Computational artifacts can be created by combining and modifying existing artifacts or by developing new artifacts. Examples of computational artifacts include programs, simulations, visualizations, digital animations, robotic systems, and apps.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards - Computer Science
STRAND / STANDARD		Computer Science Practices
OBJECTIVE		Developing and Using Abstractions

SKILL / CONCEPT	Identify patterns and extract common features from specific examples to create generalizations. Students will manage complexity by using generalized solutions and parts of solutions designed for broad reuse to simplify the development process.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards - Computer Science
STRAND / STANDARD		Computer Science Practices
OBJECTIVE		Developing a Productive Computing Environment

SKILL / CONCEPT	Understand the contexts in which people operate and consider the needs of different users during the design process. Students will address the needs of different end users to produce artifacts with broad accessibility and usability and to meet the needs of all potential end users (including themselves).

CONTENT STANDARD / COURSE		Oklahoma Academic Standards - Computer Science
STRAND / STANDARD		Computer Science Practices
OBJECTIVE		Recognizing and Defining Computational Problems

SKILL / CONCEPT		Recognize appropriate and worthwhile opportunities to apply computation. Students will work to solve a problem by defining the problem, breaking it down into parts, and evaluating each part to determine whether a computational solution is appropriate.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards - Computer Science
STRAND / STANDARD	L2.	Eleventh and Twelfth Grades: Level 2 (L2)
OBJECTIVE	L2.AP.	Algorithms & Programming (AP)
SKILL / CONCEPT	L2.AP.A.	Algorithms (A)
SKILL	L2.AP.A.01.	Model and use appropriate terminology to describe how artificial intelligence algorithms drive many software and physical systems (e.g., autonomous robots, pattern recognition, text analysis.)
SKILL	L2.AP.A.02.	Develop an artificial intelligence algorithm to play a game against a human opponent or solve a real-world problem.
SKILL	L2.AP.A.03.	Critically examine and trace classic algorithms (e.g., selection sort, insertion sort, binary search, linear search).
SKILL	L2.AP.A.04.	Evaluate algorithms (e.g., sorting, searching) in terms of their efficiency and clarity.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards - Computer Science
STRAND / STANDARD	L2.	Eleventh and Twelfth Grades: Level 2 (L2)
OBJECTIVE	L2.AP.	Algorithms & Programming (AP)
SKILL / CONCEPT	L2.AP.C.	Control (C)
SKILL	L2.AP.C.01.	Model the execution of repetition (e.g., loops, recursion) of an algorithm illustrating output and changes in values of named variables.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards - Computer Science
STRAND / STANDARD	L2.	Eleventh and Twelfth Grades: Level 2 (L2)
OBJECTIVE	L2.AP.	Algorithms & Programming (AP)
SKILL / CONCEPT	L2.AP.M.	Modularity (M)
SKILL	L2.AP.M.01.	Construct solutions to problems using student-created components (e.g., procedures, modules, objects).

Grade **11** - Adopted: **2019**

CONTENT STANDARD / COURSE		ISTE for Students 2016 (ISTE-S)

STRAND / STANDARD	ISTE- S.3.	Knowledge Constructor: Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.
OBJECTIVE	ISTE- S.3.d.	Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.

CONTENT STANDARD / COURSE		ISTE for Students 2016 (ISTE-S)
STRAND / STANDARD	ISTE- S.4.	Innovative Designer: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.
OBJECTIVE	ISTE- S.4.a.	Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
OBJECTIVE	ISTE- S.4.b.	Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.

CONTENT STANDARD / COURSE		ISTE for Students 2016 (ISTE-S)
STRAND / STANDARD	ISTE- S.5.	Computational Thinker: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.
OBJECTIVE	ISTE- S.5.a.	Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
OBJECTIVE	ISTE- S.5.b.	Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.
OBJECTIVE	ISTE- S.5.d.	Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

Oklahoma Academic Standards
Technology Education
Grade **12** - Adopted: **2023**

CONTENT STANDARD / COURSE		Oklahoma Academic Standards - Computer Science
STRAND / STANDARD		Computer Science Practices
OBJECTIVE		Creating Computational Artifacts

SKILL / CONCEPT		Develop computational artifacts to create prototypes and solve computational problems. Students create artifacts that are personally relevant or beneficial to the community and beyond. Computational artifacts can be created by combining and modifying existing artifacts or by developing new artifacts. Examples of computational artifacts include programs, simulations, visualizations, digital animations, robotic systems, and apps.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards - Computer Science
STRAND / STANDARD		Computer Science Practices
OBJECTIVE		Developing and Using Abstractions

SKILL / CONCEPT		Identify patterns and extract common features from specific examples to create generalizations. Students will manage complexity by using generalized solutions and parts of solutions designed for broad reuse to simplify the development process.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards - Computer Science
STRAND / STANDARD		Computer Science Practices
OBJECTIVE		Developing a Productive Computing Environment

SKILL / CONCEPT		Understand the contexts in which people operate and consider the needs of different users during the design process. Students will address the needs of different end users to produce artifacts with broad accessibility and usability and to meet the needs of all potential end users (including themselves).

CONTENT STANDARD / COURSE		Oklahoma Academic Standards - Computer Science
STRAND / STANDARD		Computer Science Practices
OBJECTIVE		Recognizing and Defining Computational Problems

SKILL / CONCEPT		Recognize appropriate and worthwhile opportunities to apply computation. Students will work to solve a problem by defining the problem, breaking it down into parts, and evaluating each part to determine whether a computational solution is appropriate.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards - Computer Science
STRAND / STANDARD	L2.	Eleventh and Twelfth Grades: Level 2 (L2)
OBJECTIVE	L2.AP.	Algorithms & Programming (AP)
SKILL / CONCEPT	L2.AP.A.	Algorithms (A)
SKILL	L2.AP.A.01.	Model and use appropriate terminology to describe how artificial intelligence algorithms drive many software and physical systems (e.g., autonomous robots, pattern recognition, text analysis.)
SKILL	L2.AP.A.02.	Develop an artificial intelligence algorithm to play a game against a human opponent or solve a real-world problem.
SKILL	L2.AP.A.03.	Critically examine and trace classic algorithms (e.g., selection sort, insertion sort, binary search, linear search).
SKILL	L2.AP.A.04.	Evaluate algorithms (e.g., sorting, searching) in terms of their efficiency and clarity.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards - Computer Science
STRAND / STANDARD	L2.	Eleventh and Twelfth Grades: Level 2 (L2)
OBJECTIVE	L2.AP.	Algorithms & Programming (AP)

SKILL / CONCEPT	L2.AP.C.	Control (C)
SKILL	L2.AP.C. 01.	Model the execution of repetition (e.g., loops, recursion) of an algorithm illustrating output and changes in values of named variables.

CONTENT STANDARD / COURSE		**Oklahoma Academic Standards - Computer Science**
STRAND / STANDARD	**L2.**	**Eleventh and Twelfth Grades: Level 2 (L2)**
OBJECTIVE	**L2.AP.**	**Algorithms & Programming (AP)**
SKILL / CONCEPT	L2.AP.M.	Modularity (M)
SKILL	L2.AP.M. 01.	Construct solutions to problems using student-created components (e.g., procedures, modules, objects).

Grade **12** - Adopted: **2019**

CONTENT STANDARD / COURSE		**ISTE for Students 2016 (ISTE-S)**
STRAND / STANDARD	**ISTE-S.3.**	**Knowledge Constructor: Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.**
OBJECTIVE	ISTE-S.3.d.	Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.

CONTENT STANDARD / COURSE		**ISTE for Students 2016 (ISTE-S)**
STRAND / STANDARD	**ISTE-S.4.**	**Innovative Designer: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.**
OBJECTIVE	ISTE-S.4.a.	Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
OBJECTIVE	ISTE-S.4.b.	Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.

CONTENT STANDARD / COURSE		**ISTE for Students 2016 (ISTE-S)**
STRAND / STANDARD	**ISTE-S.5.**	**Computational Thinker: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.**
OBJECTIVE	ISTE-S.5.a.	Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
OBJECTIVE	ISTE-S.5.b.	Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.
OBJECTIVE	ISTE-S.5.d.	Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.