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

Forward Education

Autonomous Electric Vehicles of the Future

Illinois Learning Standards
Mathematics
Grade **11** - Adopted: **2010**

STATE GOAL / DISCIPLINARY CONCEPT	IL.9-12.K-12.MP.	Mathematical Practices
LEARNING STANDARD / DISCIPLINE	CC.9-12.CC.K.12.MP.1.	Make sense of problems and persevere in solving them.
LEARNING STANDARD / DISCIPLINE	CC.9-12.CC.K.12.MP.2.	Reason abstractly and quantitatively.
LEARNING STANDARD / DISCIPLINE	CC.9-12.CC.K.12.MP.3.	Construct viable arguments and critique the reasoning of others.
LEARNING STANDARD / DISCIPLINE	CC.9-12.CC.K.12.MP.4.	Model with mathematics.
LEARNING STANDARD / DISCIPLINE	CC.9-12.CC.K.12.MP.8.	Look for and express regularity in repeated reasoning.

STATE GOAL / DISCIPLINARY CONCEPT	IL.9-12.A.	Algebra
LEARNING STANDARD / DISCIPLINE	**CC.9-12.A.CED.**	**Creating Equations**
DESCRIPTOR / CONTENT DISCIPLINE		**Create equations that describe numbers or relationships.**
STANDARD	CC.9-12.A.CED.2.	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

STATE GOAL / DISCIPLINARY CONCEPT	IL.9-12.A.	Algebra
LEARNING STANDARD / DISCIPLINE	**CC.9-12.A.REI.**	**Reasoning with Equations and Inequalities**
DESCRIPTOR / CONTENT DISCIPLINE		**Understand solving equations as a process of reasoning and explain the reasoning.**

STANDARD	CC.9-12.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.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.9-12.F.**	**Functions**
LEARNING STANDARD / DISCIPLINE	**CC.9-12.F.IF.**	**Interpreting Functions**
DESCRIPTOR / CONTENT DISCIPLINE		**Analyze functions using different representations.**
STANDARD	**CC.9-12.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.**
EXPECTATION	CC.9-12.F.IF.7.a.	Graph linear and quadratic functions and show intercepts, maxima, and minima.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.9-12.F.**	**Functions**
LEARNING STANDARD / DISCIPLINE	**CC.9-12.F.LE.**	**Linear and Exponential Models**
DESCRIPTOR / CONTENT DISCIPLINE		**Construct and compare linear and exponential models and solve problems.**
STANDARD	**CC.9-12.F.LE.1.**	**Distinguish between situations that can be modeled with linear functions and with exponential functions.**
EXPECTATION	CC.9-12.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.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.9-12.G.**	**Geometry**
LEARNING STANDARD / DISCIPLINE	**CC.9-12.G.GPE.**	**Expressing Geometric Properties with Equations**
DESCRIPTOR / CONTENT DISCIPLINE		**Use coordinates to prove simple geometric theorems algebraically**
STANDARD	CC.9-12.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).

Illinois Learning Standards

Mathematics

Grade **12** - Adopted: **2010**

STATE GOAL / DISCIPLINARY CONCEPT	**IL.9-12.K-12.MP.**	**Mathematical Practices**

LEARNING STANDARD / DISCIPLINE	CC.9-12.CC.K.12.MP.1.	Make sense of problems and persevere in solving them.
LEARNING STANDARD / DISCIPLINE	CC.9-12.CC.K.12.MP.2.	Reason abstractly and quantitatively.
LEARNING STANDARD / DISCIPLINE	CC.9-12.CC.K.12.MP.3.	Construct viable arguments and critique the reasoning of others.
LEARNING STANDARD / DISCIPLINE	CC.9-12.CC.K.12.MP.4.	Model with mathematics.
LEARNING STANDARD / DISCIPLINE	CC.9-12.CC.K.12.MP.8.	Look for and express regularity in repeated reasoning.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.9-12.A.**	**Algebra**
LEARNING STANDARD / DISCIPLINE	**CC.9-12.A.CED.**	**Creating Equations**
DESCRIPTOR / CONTENT DISCIPLINE		**Create equations that describe numbers or relationships.**
STANDARD	CC.9-12.A.CED.2.	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.9-12.A.**	**Algebra**
LEARNING STANDARD / DISCIPLINE	**CC.9-12.A.REI.**	**Reasoning with Equations and Inequalities**
DESCRIPTOR / CONTENT DISCIPLINE		**Understand solving equations as a process of reasoning and explain the reasoning.**
STANDARD	CC.9-12.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.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.9-12.F.**	**Functions**
LEARNING STANDARD / DISCIPLINE	**CC.9-12.F.IF.**	**Interpreting Functions**
DESCRIPTOR / CONTENT DISCIPLINE		**Analyze functions using different representations.**

STANDARD	**CC.9-12.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.**
EXPECTATION	CC.9-12.F.IF.7.a.	Graph linear and quadratic functions and show intercepts, maxima, and minima.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.9-12.F.**	**Functions**
LEARNING STANDARD / DISCIPLINE	**CC.9-12.F.LE.**	**Linear and Exponential Models**
DESCRIPTOR / CONTENT DISCIPLINE		**Construct and compare linear and exponential models and solve problems.**
STANDARD	**CC.9-12.F.LE.1.**	**Distinguish between situations that can be modeled with linear functions and with exponential functions.**
EXPECTATION	CC.9-12.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.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.9-12.G.**	**Geometry**
LEARNING STANDARD / DISCIPLINE	**CC.9-12.G.GPE.**	**Expressing Geometric Properties with Equations**
DESCRIPTOR / CONTENT DISCIPLINE		**Use coordinates to prove simple geometric theorems algebraically**
STANDARD	CC.9-12.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).

Illinois Learning Standards

Science

Grade **11** - Adopted: **2014**

STATE GOAL / DISCIPLINARY CONCEPT	**IL.HS-PS.**	**PHYSICAL SCIENCE**
LEARNING STANDARD / DISCIPLINE	**HS-PS1.**	**Matter and Its Interactions**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
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.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.HS-PS.**	**PHYSICAL SCIENCE**
LEARNING STANDARD / DISCIPLINE	**HS-PS3.**	**Energy**

DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
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.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.HS-PS.**	**PHYSICAL SCIENCE**
LEARNING STANDARD / DISCIPLINE	**HS-PS4.**	**Waves and Their Applications in Technologies for Information Transfer**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.HS-LS.**	**LIFE SCIENCE**
LEARNING STANDARD / DISCIPLINE	**HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.HS-ESS.**	**EARTH AND SPACE SCIENCE**
LEARNING STANDARD / DISCIPLINE	**HS-ESS2.**	**Earth's Systems**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
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.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.HS-ESS.**	**EARTH AND SPACE SCIENCE**
LEARNING STANDARD / DISCIPLINE	**HS-ESS3.**	**Earth and Human Activity**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
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	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
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	HS-ESS3-4.	Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.
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.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.HS-ETS.**	**ENGINEERING DESIGN**
LEARNING STANDARD / DISCIPLINE	**HS-ETS1.**	**Engineering Design**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	HS-ETS1-1.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
STANDARD	HS-ETS1-2.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
STANDARD	HS-ETS1-3.	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

Grade **11** - Adopted: **2010**

STATE GOAL / DISCIPLINARY CONCEPT	**IL.11-12.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Key Ideas and Details**
DESCRIPTOR / CONTENT DISCIPLINE	CC.11-12.RST.2.	Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
DESCRIPTOR / CONTENT DISCIPLINE	CC.11-12.RST.3.	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.11-12.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Craft and Structure**

DESCRIPTOR / CONTENT DISCIPLINE	CC.11-12.RST.4.	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
DESCRIPTOR / CONTENT DISCIPLINE	CC.11-12.RST.5.	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.11-12.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Integration of Knowledge and Ideas**
DESCRIPTOR / CONTENT DISCIPLINE	CC.11-12.RST.9.	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.11-12.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Range of Reading and Level of Text Complexity**
DESCRIPTOR / CONTENT DISCIPLINE	CC.11-12.RST.10.	By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.11-12.WHST.**	**Writing Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Text Types and Purposes**
DESCRIPTOR / CONTENT DISCIPLINE	**CC.11-12.WHST.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
STANDARD	CC.11-12.WHST.2.d.	Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.11-12.WHST.**	**Writing Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Production and Distribution of Writing**
DESCRIPTOR / CONTENT DISCIPLINE	CC.11-12.WHST.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
DESCRIPTOR / CONTENT DISCIPLINE	CC.11-12.WHST.6.	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

Illinois Learning Standards

Science

Grade **12** - Adopted: **2014**

STATE GOAL / DISCIPLINARY CONCEPT	**IL.HS-PS.**	**PHYSICAL SCIENCE**
LEARNING STANDARD / DISCIPLINE	**HS-PS1.**	**Matter and Its Interactions**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
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.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.HS-PS.**	**PHYSICAL SCIENCE**
LEARNING STANDARD / DISCIPLINE	**HS-PS3.**	**Energy**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
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.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.HS-PS.**	**PHYSICAL SCIENCE**
LEARNING STANDARD / DISCIPLINE	**HS-PS4.**	**Waves and Their Applications in Technologies for Information Transfer**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.HS-LS.**	**LIFE SCIENCE**
LEARNING STANDARD / DISCIPLINE	**HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.HS-ESS.**	**EARTH AND SPACE SCIENCE**

LEARNING STANDARD / DISCIPLINE	**HS-ESS2.**	**Earth's Systems**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
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.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.HS-ESS.**	**EARTH AND SPACE SCIENCE**
LEARNING STANDARD / DISCIPLINE	**HS-ESS3.**	**Earth and Human Activity**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
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	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
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	HS-ESS3-4.	Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.
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.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.HS-ETS.**	**ENGINEERING DESIGN**
LEARNING STANDARD / DISCIPLINE	**HS-ETS1.**	**Engineering Design**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	HS-ETS1-1.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
STANDARD	HS-ETS1-2.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
STANDARD	HS-ETS1-3.	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.11-12.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Key Ideas and Details**
DESCRIPTOR / CONTENT DISCIPLINE	CC.11-12.RST.2.	Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
DESCRIPTOR / CONTENT DISCIPLINE	CC.11-12.RST.3.	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.11-12.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Craft and Structure**
DESCRIPTOR / CONTENT DISCIPLINE	CC.11-12.RST.4.	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
DESCRIPTOR / CONTENT DISCIPLINE	CC.11-12.RST.5.	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.11-12.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Integration of Knowledge and Ideas**
DESCRIPTOR / CONTENT DISCIPLINE	CC.11-12.RST.9.	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.11-12.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Range of Reading and Level of Text Complexity**
DESCRIPTOR / CONTENT DISCIPLINE	CC.11-12.RST.10.	By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.11-12.WHST.**	**Writing Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Text Types and Purposes**

DESCRIPTOR / CONTENT DISCIPLINE	**CC.11-12.WHST.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
STANDARD	CC.11-12.WHST.2.d.	Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.11-12.WHST.**	**Writing Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Production and Distribution of Writing**
DESCRIPTOR / CONTENT DISCIPLINE	CC.11-12.WHST.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
DESCRIPTOR / CONTENT DISCIPLINE	CC.11-12.WHST.6.	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

Illinois Learning Standards

Technology Education

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

STATE GOAL / DISCIPLINARY CONCEPT		**Illinois Computer Science Standards**
LEARNING STANDARD / DISCIPLINE		**Computer Science Practices**
DESCRIPTOR / CONTENT DISCIPLINE	3	Recognizing and defining computational problems.
DESCRIPTOR / CONTENT DISCIPLINE	5	Creating computational artifacts.
DESCRIPTOR / CONTENT DISCIPLINE	6	Testing and refining computational artifacts.
STATE GOAL / DISCIPLINARY CONCEPT		**Illinois Computer Science Standards**
LEARNING STANDARD / DISCIPLINE		**Computer Science Standards**
DESCRIPTOR / CONTENT DISCIPLINE	**11-12.AP.**	**Algorithms and Programming**
STANDARD		**Algorithms**

EXPECTATION	11-12.AP.13.	Evaluate algorithms in terms of their efficiency, correctness, and clarity.

STATE GOAL / DISCIPLINARY CONCEPT		**Illinois Computer Science Standards**
LEARNING STANDARD / DISCIPLINE		**Computer Science Standards**
DESCRIPTOR / CONTENT DISCIPLINE	**11-12.AP.**	**Algorithms and Programming**
STANDARD		**Control**
EXPECTATION	11-12.AP.15.	Illustrate the flow of execution of a recursive algorithm.

STATE GOAL / DISCIPLINARY CONCEPT		**Illinois Computer Science Standards**
LEARNING STANDARD / DISCIPLINE		**Computer Science Standards**
DESCRIPTOR / CONTENT DISCIPLINE	**11-12.AP.**	**Algorithms and Programming**
STANDARD		**Modularity**
EXPECTATION	11-12.AP.16.	Construct solutions to problems using student-created components, such as procedures, modules, or objects.
EXPECTATION	11-12.AP.17.	Analyze a large-scale computational problem and identify generalizable patterns that can be applied to a solution.

STATE GOAL / DISCIPLINARY CONCEPT		**Illinois Computer Science Standards**
LEARNING STANDARD / DISCIPLINE		**Computer Science Standards**
DESCRIPTOR / CONTENT DISCIPLINE	**11-12.AP.**	**Algorithms and Programming**
STANDARD		**Program Development**
EXPECTATION	11-12.AP.28.	Compare multiple programming languages and discuss how their features make them suitable for solving different types of problems.

STATE GOAL / DISCIPLINARY CONCEPT		**Illinois Computer Science Standards**
LEARNING STANDARD / DISCIPLINE		**Computer Science Standards**

DESCRIPTOR / CONTENT DISCIPLINE	**11-12.ET.**	**Emerging and Future Technologies**
STANDARD	11-12.ET.E.	Create new or original work by applying emerging technologies.

Grade **11** - Adopted: **2016**

STATE GOAL / DISCIPLINARY CONCEPT		**ISTE Standards for Students**
LEARNING STANDARD / DISCIPLINE	**IL.ISTE-S.3.**	**Knowledge Constructors: 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.**
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.3.d.	Build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.

STATE GOAL / DISCIPLINARY CONCEPT		**ISTE Standards for Students**
LEARNING STANDARD / DISCIPLINE	**IL.ISTE-S.4.**	**Innovative Designers: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.**
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.4.a.	Know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.4.b.	Select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.

STATE GOAL / DISCIPLINARY CONCEPT		**ISTE Standards for Students**
LEARNING STANDARD / DISCIPLINE	**IL.ISTE-S.5.**	**Computational Thinkers: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.**
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.5.a.	Formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models, and algorithmic thinking in exploring and finding solutions.
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.5.b.	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.
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.5.d.	Understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

Illinois Learning Standards

Technology Education

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

STATE GOAL / DISCIPLINARY CONCEPT		Illinois Computer Science Standards
LEARNING STANDARD / DISCIPLINE		**Computer Science Practices**
DESCRIPTOR / CONTENT DISCIPLINE	3	Recognizing and defining computational problems.
DESCRIPTOR / CONTENT DISCIPLINE	5	Creating computational artifacts.
DESCRIPTOR / CONTENT DISCIPLINE	6	Testing and refining computational artifacts.

STATE GOAL / DISCIPLINARY CONCEPT		Illinois Computer Science Standards
LEARNING STANDARD / DISCIPLINE		**Computer Science Standards**
DESCRIPTOR / CONTENT DISCIPLINE	**11-12.AP.**	**Algorithms and Programming**
STANDARD		**Algorithms**
EXPECTATION	11-12.AP.13.	Evaluate algorithms in terms of their efficiency, correctness, and clarity.

STATE GOAL / DISCIPLINARY CONCEPT		Illinois Computer Science Standards
LEARNING STANDARD / DISCIPLINE		**Computer Science Standards**
DESCRIPTOR / CONTENT DISCIPLINE	**11-12.AP.**	**Algorithms and Programming**
STANDARD		**Control**
EXPECTATION	11-12.AP.15.	Illustrate the flow of execution of a recursive algorithm.

STATE GOAL / DISCIPLINARY CONCEPT		Illinois Computer Science Standards
LEARNING STANDARD / DISCIPLINE		**Computer Science Standards**
DESCRIPTOR / CONTENT DISCIPLINE	**11-12.AP.**	**Algorithms and Programming**
STANDARD		**Modularity**

EXPECTATION	11-12.AP.16.	Construct solutions to problems using student-created components, such as procedures, modules, or objects.
EXPECTATION	11-12.AP.17.	Analyze a large-scale computational problem and identify generalizable patterns that can be applied to a solution.
STATE GOAL / DISCIPLINARY CONCEPT		**Illinois Computer Science Standards**
LEARNING STANDARD / DISCIPLINE		**Computer Science Standards**
DESCRIPTOR / CONTENT DISCIPLINE	**11-12.AP.**	**Algorithms and Programming**
STANDARD		**Program Development**
EXPECTATION	11-12.AP.28.	Compare multiple programming languages and discuss how their features make them suitable for solving different types of problems.
STATE GOAL / DISCIPLINARY CONCEPT		**Illinois Computer Science Standards**
LEARNING STANDARD / DISCIPLINE		**Computer Science Standards**
DESCRIPTOR / CONTENT DISCIPLINE	**11-12.ET.**	**Emerging and Future Technologies**
STANDARD	11-12.ET.E.	Create new or original work by applying emerging technologies.

Grade **12** - Adopted: **2016**

STATE GOAL / DISCIPLINARY CONCEPT		**ISTE Standards for Students**
LEARNING STANDARD / DISCIPLINE	**IL.ISTE-S.3.**	**Knowledge Constructors: 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.**
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.3.d.	Build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.
STATE GOAL / DISCIPLINARY CONCEPT		**ISTE Standards for Students**
LEARNING STANDARD / DISCIPLINE	**IL.ISTE-S.4.**	**Innovative Designers: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.**
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.4.a.	Know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.

DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.4.b.	Select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
STATE GOAL / DISCIPLINARY CONCEPT		**ISTE Standards for Students**
LEARNING STANDARD / DISCIPLINE	**IL.ISTE-S.5.**	**Computational Thinkers: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.**
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.5.a.	Formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models, and algorithmic thinking in exploring and finding solutions.
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.5.b.	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.
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.5.d.	Understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.