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

Forward Education

Autonomous Electric Vehicles of the Future

West Virginia College and Career Readiness Standards
Mathematics
Grade **11** - Adopted: **2016**

CONTENT STANDARD / COURSE	WV.M.MHM.	Mathematical Habits of Mind
CONTENT STANDARD / OBJECTIVE	MHM1.	Make sense of problems and persevere in solving them.
CONTENT STANDARD / OBJECTIVE	MHM2.	Reason abstractly and quantitatively.
CONTENT STANDARD / OBJECTIVE	MHM3.	Construct viable arguments and critique the reasoning of others.
CONTENT STANDARD / OBJECTIVE	MHM4.	Model with mathematics.
CONTENT STANDARD / OBJECTIVE	MHM8.	Look for and express regularity in repeated reasoning.

CONTENT STANDARD / COURSE	WV.M.1HS.	High School Mathematics I
CONTENT STANDARD / OBJECTIVE		**Relationships between Quantities**
OBJECTIVE / EXPECTATION		**Create equations that describe numbers or relationships.**
GRADE LEVEL EXPECTATION	M.1HS.6.	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

CONTENT STANDARD / COURSE	WV.M.1HS.	High School Mathematics I
CONTENT STANDARD / OBJECTIVE		**Linear and Exponential Relationships**
OBJECTIVE / EXPECTATION		**Analyze functions using different representations.**
GRADE LEVEL EXPECTATION	**M.1HS.18.**	**Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.**

INDICATOR	M.1HS.18.a.	Graph linear and quadratic functions and show intercepts, maxima, and minima.

CONTENT STANDARD / COURSE	**WV.M.1HS.**	**High School Mathematics I**
CONTENT STANDARD / OBJECTIVE		**Linear and Exponential Relationships**
OBJECTIVE / EXPECTATION		**Construct and compare linear, quadratic, and exponential models and solve problems.**
GRADE LEVEL EXPECTATION	**M.1HS.23.**	**Distinguish between situations that can be modeled with linear functions and with exponential functions.**
INDICATOR	M.1HS.23.a.	Prove that linear functions grow by equal differences over equal intervals; exponential functions grow by equal factors over equal intervals.

CONTENT STANDARD / COURSE	**WV.M.1HS.**	**High School Mathematics I**
CONTENT STANDARD / OBJECTIVE		**Reasoning with Equations**
OBJECTIVE / EXPECTATION		**Understand solving equations as a process of reasoning and explain the reasoning.**
GRADE LEVEL EXPECTATION	M.1HS.27.	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.

CONTENT STANDARD / COURSE	**WV.M.1HS.**	**High School Mathematics I**
CONTENT STANDARD / OBJECTIVE		**Connecting Algebra and Geometry through Coordinates**
OBJECTIVE / EXPECTATION		**Use coordinates to prove simple geometric theorems algebraically.**
GRADE LEVEL EXPECTATION	M.1HS.50.	Prove the slope criteria for parallel and perpendicular lines; 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.)

CONTENT STANDARD / COURSE	**WV.M.2HS.**	**High School Mathematics II**
CONTENT STANDARD / OBJECTIVE		**Analyze functions using different representations.**
OBJECTIVE / EXPECTATION	**M.2HS.10.**	**Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.**
GRADE LEVEL EXPECTATION	M.2HS.10.a.	Graph linear and quadratic functions and show intercepts, maxima, and minima.

CONTENT STANDARD / COURSE	**WV.M.2HS.**	**High School Mathematics II**

CONTENT STANDARD / OBJECTIVE		**Expressions and Equations**
OBJECTIVE / EXPECTATION		**Create equations that describe numbers or relationships.**
GRADE LEVEL EXPECTATION	M.2HS.21.	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

CONTENT STANDARD / COURSE	**WV.M.3HSLA.**	**High School Mathematics III LA**
CONTENT STANDARD / OBJECTIVE		**Mathematical Modeling**
OBJECTIVE / EXPECTATION		**Create equations that describe numbers or relationships.**
GRADE LEVEL EXPECTATION	M.3HSLA.32.	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

CONTENT STANDARD / COURSE	**WV.M.3HSTR.**	**High School Mathematics III TR (Technical Readiness)**
CONTENT STANDARD / OBJECTIVE		**Mathematical Modeling**
OBJECTIVE / EXPECTATION		**Create equations that describe numbers or relationships.**
GRADE LEVEL EXPECTATION	M.3HSTR.32.	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

CONTENT STANDARD / COURSE	**WV.M.4HSTR.**	**High School Mathematics IV TR (Technical Readiness)**
CONTENT STANDARD / OBJECTIVE		**Mathematical Modeling**
OBJECTIVE / EXPECTATION		**Create equations that describe numbers or relationships.**
GRADE LEVEL EXPECTATION	M.4HSTR.32.	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

CONTENT STANDARD / COURSE	**WV.M.A1HS.**	**High School Algebra I**
CONTENT STANDARD / OBJECTIVE		**Relationships between Quantities and Reasoning with Equations**
OBJECTIVE / EXPECTATION		**Create equations that describe numbers or relationships.**
GRADE LEVEL EXPECTATION	M.A1HS.6.	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

CONTENT STANDARD / COURSE	**WV.M.A1 HS.**	**High School Algebra I**
CONTENT STANDARD / OBJECTIVE		**Relationships between Quantities and Reasoning with Equations**
OBJECTIVE / EXPECTATION		**Understand solving equations as a process of reasoning and explain the reasoning.**
GRADE LEVEL EXPECTATION	M.A1HS. 9.	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.

CONTENT STANDARD / COURSE	**WV.M.A1 HS.**	**High School Algebra I**
CONTENT STANDARD / OBJECTIVE		**Linear and Exponential Relationships**
OBJECTIVE / EXPECTATION		**Analyze functions using different representations.**
GRADE LEVEL EXPECTATION	**M.A1HS. 24.**	**Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.**
INDICATOR	M.A1HS.24.a.	Graph linear and quadratic functions and show intercepts, maxima, and minima.

CONTENT STANDARD / COURSE	**WV.M.A1 HS.**	**High School Algebra I**
CONTENT STANDARD / OBJECTIVE		**Linear and Exponential Relationships**
OBJECTIVE / EXPECTATION		**Construct and compare linear, quadratic, and exponential models and solve problems.**
GRADE LEVEL EXPECTATION	**M.A1HS. 29.**	**Distinguish between situations that can be modeled with linear functions and with exponential functions.**
INDICATOR	M.A1HS.29.a.	Prove that linear functions grow by equal differences over equal intervals; exponential functions grow by equal factors over equal intervals.

CONTENT STANDARD / COURSE	**WV.M.A1 HS.**	**High School Algebra I**
CONTENT STANDARD / OBJECTIVE		**Expressions and Equations**
OBJECTIVE / EXPECTATION		**Create equations that describe numbers or relationships.**
GRADE LEVEL EXPECTATION	M.A1HS. 46.	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

CONTENT STANDARD / COURSE	**WV.M.A1 HS.**	**High School Algebra I**

CONTENT STANDARD / OBJECTIVE		**Quadratic Functions and Modeling**
OBJECTIVE / EXPECTATION		**Analyze functions using different representations.**
GRADE LEVEL EXPECTATION	**M.A1HS.54.**	**Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.**
INDICATOR	M.A1HS.54.a.	Graph linear and quadratic functions and show intercepts, maxima, and minima.

CONTENT STANDARD / COURSE	**WV.M.GHS.**	**High School Geometry**
CONTENT STANDARD / OBJECTIVE		**Connecting Algebra and Geometry Through Coordinates**
OBJECTIVE / EXPECTATION		**Use coordinates to prove simple geometric theorems algebraically.**
GRADE LEVEL EXPECTATION	M.GHS.30.	Prove the slope criteria for parallel and perpendicular lines and uses 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.)

CONTENT STANDARD / COURSE	**WV.M.A2HS.**	**High School Algebra II**
CONTENT STANDARD / OBJECTIVE		**Modeling with Functions**
OBJECTIVE / EXPECTATION		**Create equations that describe numbers or relationships.**
GRADE LEVEL EXPECTATION	M.A2HS.24.	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

CONTENT STANDARD / COURSE	**WV.M.TMS.**	**Transition Mathematics for Seniors**
CONTENT STANDARD / OBJECTIVE		**Algebra – Seeing Structure in Expressions**
OBJECTIVE / EXPECTATION		**Understand the connections between proportional relationship, lines, and linear equations.**
GRADE LEVEL EXPECTATION	M.TMS.7.	Graph proportional relationships, interpreting the unit rates as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.

CONTENT STANDARD / COURSE	**WV.M.TMS.**	**Transition Mathematics for Seniors**
CONTENT STANDARD / OBJECTIVE		**Algebra – Creating Equations**
OBJECTIVE / EXPECTATION		**Create equations that describe numbers or relationships.**

GRADE LEVEL EXPECTATION	M.TMS.12.	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

CONTENT STANDARD / COURSE	**WV.M.TMS.**	**Transition Mathematics for Seniors**
CONTENT STANDARD / OBJECTIVE		**Algebra – Reasoning with Equations and Inequalities**
OBJECTIVE / EXPECTATION		**Solve equations and inequalities in one variable.**

GRADE LEVEL EXPECTATION	M.TMS.17.	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.

CONTENT STANDARD / COURSE	**WV.M.TMS.**	**Transition Mathematics for Seniors**
CONTENT STANDARD / OBJECTIVE		**Functions – Interpreting Functions**
OBJECTIVE / EXPECTATION		**Interpret functions that arise in applications in terms of the context.**

GRADE LEVEL EXPECTATION	M.TMS.28.	Distinguish between situations that can be modeled with linear functions and with exponential functions.

CONTENT STANDARD / COURSE	**WV.M.TMS.**	**Transition Mathematics for Seniors**
CONTENT STANDARD / OBJECTIVE		**Functions – Interpreting Functions**
OBJECTIVE / EXPECTATION		**Analyze functions using different representations.**
GRADE LEVEL EXPECTATION	**M.TMS.32.**	**Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.**
INDICATOR	M.TMS.32.a.	Graph linear and quadratic functions and show intercepts, maxima, and minima.

West Virginia College and Career Readiness Standards

Mathematics

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

CONTENT STANDARD / COURSE	**WV.M.MHM.**	**Mathematical Habits of Mind**
CONTENT STANDARD / OBJECTIVE	MHM1.	Make sense of problems and persevere in solving them.
CONTENT STANDARD / OBJECTIVE	MHM2.	Reason abstractly and quantitatively.

CONTENT STANDARD / OBJECTIVE	MHM3.	Construct viable arguments and critique the reasoning of others.
CONTENT STANDARD / OBJECTIVE	MHM4.	Model with mathematics.
CONTENT STANDARD / OBJECTIVE	MHM8.	Look for and express regularity in repeated reasoning.
CONTENT STANDARD / COURSE	**WV.M.1HS.**	**High School Mathematics I**
CONTENT STANDARD / OBJECTIVE		**Relationships between Quantities**
OBJECTIVE / EXPECTATION		**Create equations that describe numbers or relationships.**
GRADE LEVEL EXPECTATION	M.1HS.6.	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
CONTENT STANDARD / COURSE	**WV.M.1HS.**	**High School Mathematics I**
CONTENT STANDARD / OBJECTIVE		**Linear and Exponential Relationships**
OBJECTIVE / EXPECTATION		**Analyze functions using different representations.**
GRADE LEVEL EXPECTATION	**M.1HS.18.**	**Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.**
INDICATOR	M.1HS.18.a.	Graph linear and quadratic functions and show intercepts, maxima, and minima.
CONTENT STANDARD / COURSE	**WV.M.1HS.**	**High School Mathematics I**
CONTENT STANDARD / OBJECTIVE		**Linear and Exponential Relationships**
OBJECTIVE / EXPECTATION		**Construct and compare linear, quadratic, and exponential models and solve problems.**
GRADE LEVEL EXPECTATION	**M.1HS.23.**	**Distinguish between situations that can be modeled with linear functions and with exponential functions.**
INDICATOR	M.1HS.23.a.	Prove that linear functions grow by equal differences over equal intervals; exponential functions grow by equal factors over equal intervals.
CONTENT STANDARD / COURSE	**WV.M.1HS.**	**High School Mathematics I**

CONTENT STANDARD / OBJECTIVE		**Reasoning with Equations**
OBJECTIVE / EXPECTATION		**Understand solving equations as a process of reasoning and explain the reasoning.**
GRADE LEVEL EXPECTATION	M.1HS.27.	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.

CONTENT STANDARD / COURSE	**WV.M.1HS.**	**High School Mathematics I**
CONTENT STANDARD / OBJECTIVE		**Connecting Algebra and Geometry through Coordinates**
OBJECTIVE / EXPECTATION		**Use coordinates to prove simple geometric theorems algebraically.**
GRADE LEVEL EXPECTATION	M.1HS.50.	Prove the slope criteria for parallel and perpendicular lines; 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.)

CONTENT STANDARD / COURSE	**WV.M.2HS.**	**High School Mathematics II**
CONTENT STANDARD / OBJECTIVE		**Analyze functions using different representations.**
OBJECTIVE / EXPECTATION	**M.2HS.10.**	**Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.**
GRADE LEVEL EXPECTATION	M.2HS.10.a.	Graph linear and quadratic functions and show intercepts, maxima, and minima.

CONTENT STANDARD / COURSE	**WV.M.2HS.**	**High School Mathematics II**
CONTENT STANDARD / OBJECTIVE		**Expressions and Equations**
OBJECTIVE / EXPECTATION		**Create equations that describe numbers or relationships.**
GRADE LEVEL EXPECTATION	M.2HS.21.	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

CONTENT STANDARD / COURSE	**WV.M.3HSLA.**	**High School Mathematics III LA**
CONTENT STANDARD / OBJECTIVE		**Mathematical Modeling**
OBJECTIVE / EXPECTATION		**Create equations that describe numbers or relationships.**
GRADE LEVEL EXPECTATION	M.3HSLA.32.	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

CONTENT STANDARD / COURSE	**WV.M.3HSTR.**	**High School Mathematics III TR (Technical Readiness)**
CONTENT STANDARD / OBJECTIVE		**Mathematical Modeling**
OBJECTIVE / EXPECTATION		**Create equations that describe numbers or relationships.**
GRADE LEVEL EXPECTATION	M.3HSTR.32.	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

CONTENT STANDARD / COURSE	**WV.M.4HSTR.**	**High School Mathematics IV TR (Technical Readiness)**
CONTENT STANDARD / OBJECTIVE		**Mathematical Modeling**
OBJECTIVE / EXPECTATION		**Create equations that describe numbers or relationships.**
GRADE LEVEL EXPECTATION	M.4HSTR.32.	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

CONTENT STANDARD / COURSE	**WV.M.A1HS.**	**High School Algebra I**
CONTENT STANDARD / OBJECTIVE		**Relationships between Quantities and Reasoning with Equations**
OBJECTIVE / EXPECTATION		**Create equations that describe numbers or relationships.**
GRADE LEVEL EXPECTATION	M.A1HS.6.	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

CONTENT STANDARD / COURSE	**WV.M.A1HS.**	**High School Algebra I**
CONTENT STANDARD / OBJECTIVE		**Relationships between Quantities and Reasoning with Equations**
OBJECTIVE / EXPECTATION		**Understand solving equations as a process of reasoning and explain the reasoning.**
GRADE LEVEL EXPECTATION	M.A1HS.9.	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.

CONTENT STANDARD / COURSE	**WV.M.A1HS.**	**High School Algebra I**
CONTENT STANDARD / OBJECTIVE		**Linear and Exponential Relationships**
OBJECTIVE / EXPECTATION		**Analyze functions using different representations.**

GRADE LEVEL EXPECTATION	**M.A1HS.24.**	**Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.**
INDICATOR	M.A1HS.24.a.	Graph linear and quadratic functions and show intercepts, maxima, and minima.

CONTENT STANDARD / COURSE	**WV.M.A1HS.**	**High School Algebra I**
CONTENT STANDARD / OBJECTIVE		**Linear and Exponential Relationships**
OBJECTIVE / EXPECTATION		**Construct and compare linear, quadratic, and exponential models and solve problems.**
GRADE LEVEL EXPECTATION	**M.A1HS.29.**	**Distinguish between situations that can be modeled with linear functions and with exponential functions.**
INDICATOR	M.A1HS.29.a.	Prove that linear functions grow by equal differences over equal intervals; exponential functions grow by equal factors over equal intervals.

CONTENT STANDARD / COURSE	**WV.M.A1HS.**	**High School Algebra I**
CONTENT STANDARD / OBJECTIVE		**Expressions and Equations**
OBJECTIVE / EXPECTATION		**Create equations that describe numbers or relationships.**
GRADE LEVEL EXPECTATION	M.A1HS.46.	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

CONTENT STANDARD / COURSE	**WV.M.A1HS.**	**High School Algebra I**
CONTENT STANDARD / OBJECTIVE		**Quadratic Functions and Modeling**
OBJECTIVE / EXPECTATION		**Analyze functions using different representations.**
GRADE LEVEL EXPECTATION	**M.A1HS.54.**	**Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.**
INDICATOR	M.A1HS.54.a.	Graph linear and quadratic functions and show intercepts, maxima, and minima.

CONTENT STANDARD / COURSE	**WV.M.GHS.**	**High School Geometry**
CONTENT STANDARD / OBJECTIVE		**Connecting Algebra and Geometry Through Coordinates**
OBJECTIVE / EXPECTATION		**Use coordinates to prove simple geometric theorems algebraically.**
GRADE LEVEL EXPECTATION	M.GHS.30.	Prove the slope criteria for parallel and perpendicular lines and uses 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.)

CONTENT STANDARD / COURSE	**WV.M.A2HS.**	**High School Algebra II**
CONTENT STANDARD / OBJECTIVE		**Modeling with Functions**
OBJECTIVE / EXPECTATION		**Create equations that describe numbers or relationships.**
GRADE LEVEL EXPECTATION	M.A2HS.24.	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

CONTENT STANDARD / COURSE	**WV.M.TMS.**	**Transition Mathematics for Seniors**
CONTENT STANDARD / OBJECTIVE		**Algebra – Seeing Structure in Expressions**
OBJECTIVE / EXPECTATION		**Understand the connections between proportional relationship, lines, and linear equations.**
GRADE LEVEL EXPECTATION	M.TMS.7.	Graph proportional relationships, interpreting the unit rates as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.

CONTENT STANDARD / COURSE	**WV.M.TMS.**	**Transition Mathematics for Seniors**
CONTENT STANDARD / OBJECTIVE		**Algebra – Creating Equations**
OBJECTIVE / EXPECTATION		**Create equations that describe numbers or relationships.**
GRADE LEVEL EXPECTATION	M.TMS.12.	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

CONTENT STANDARD / COURSE	**WV.M.TMS.**	**Transition Mathematics for Seniors**
CONTENT STANDARD / OBJECTIVE		**Algebra – Reasoning with Equations and Inequalities**
OBJECTIVE / EXPECTATION		**Solve equations and inequalities in one variable.**
GRADE LEVEL EXPECTATION	M.TMS.17.	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.

CONTENT STANDARD / COURSE	**WV.M.TMS.**	**Transition Mathematics for Seniors**
CONTENT STANDARD / OBJECTIVE		**Functions – Interpreting Functions**
OBJECTIVE / EXPECTATION		**Interpret functions that arise in applications in terms of the context.**

GRADE LEVEL EXPECTATION	M.TMS.28.	Distinguish between situations that can be modeled with linear functions and with exponential functions.
CONTENT STANDARD / COURSE	**WV.M.TMS.**	**Transition Mathematics for Seniors**
CONTENT STANDARD / OBJECTIVE		**Functions – Interpreting Functions**
OBJECTIVE / EXPECTATION		**Analyze functions using different representations.**
GRADE LEVEL EXPECTATION	**M.TMS.32.**	**Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.**
INDICATOR	M.TMS.32.a.	Graph linear and quadratic functions and show intercepts, maxima, and minima.

West Virginia College and Career Readiness Standards

Science

Grade **11** - Adopted: **2021**

CONTENT STANDARD / COURSE		**Science Indicators Grades 9-12**
CONTENT STANDARD / OBJECTIVE		**College- and Career-Readiness Indicators for Science**
OBJECTIVE / EXPECTATION		**Practices of Scientists and Engineers**
GRADE LEVEL EXPECTATION		Developing and using models
GRADE LEVEL EXPECTATION		Constructing explanations and designing solutions
GRADE LEVEL EXPECTATION		Obtaining, evaluating, and communicating information
CONTENT STANDARD / COURSE		**Science Indicators Grades 9-12**
CONTENT STANDARD / OBJECTIVE		**College- and Career-Readiness Indicators for Science**
OBJECTIVE / EXPECTATION		**Science Connecting Concepts**
GRADE LEVEL EXPECTATION		Investigating and explaining cause and effect
CONTENT STANDARD / COURSE		**Science Indicators Grades 9-12**
CONTENT STANDARD / OBJECTIVE		**College- and Career-Readiness Indicators for Science**

OBJECTIVE / EXPECTATION		**Science Literacy**
GRADE LEVEL EXPECTATION		Reading with understanding articles about science in the popular press and engaging in social conversation about the validity of the conclusions
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Earth's Systems**
OBJECTIVE / EXPECTATION	**S.ESS.8.**	**Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.**
GRADE LEVEL EXPECTATION	**S.ESS.8.2.**	**examples could include:**
INDICATOR	S.ESS.8.2.b.	greenhouse gasses
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Weather and Climate**
OBJECTIVE / EXPECTATION	**S.ESS.13.**	**Use a model to describe how variations in the flow of energy into and out of Earth systems result in changes in climate.**
GRADE LEVEL EXPECTATION	S.ESS.13.1.	changes in climate
GRADE LEVEL EXPECTATION	S.ESS.13.6.	atmospheric composition.
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Human Sustainability**
OBJECTIVE / EXPECTATION	**S.ESS.15.**	**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. Examples include:**
GRADE LEVEL EXPECTATION	S.ESS.15.3.	fossil fuels and mining
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Human Sustainability**
OBJECTIVE / EXPECTATION	**S.ESS.16.**	**Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.**

GRADE LEVEL EXPECTATION	S.ESS.16.1.	conservation, reuse, recycling

CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Human Sustainability**
OBJECTIVE / EXPECTATION	**S.ESS.17.**	**Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.**

GRADE LEVEL EXPECTATION	S.ESS.17.4.	new technology development.

CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Human Sustainability**
OBJECTIVE / EXPECTATION	**S.ESS.18.**	**Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.**
GRADE LEVEL EXPECTATION	**S.ESS.18.2.**	**deducing impact examples include:**

INDICATOR	S.ESS.18.2.c.	geoengineering design solutions.

CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Human Sustainability**
OBJECTIVE / EXPECTATION	**S.ESS.19.**	**Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.**

GRADE LEVEL EXPECTATION	S.ESS.19.3.	cryosphere

CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Engineering, Technology, and Applications of Science**
OBJECTIVE / EXPECTATION		**Engineering Design**
GRADE LEVEL EXPECTATION	**S.ESS.20.**	**Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. In reference to:**

INDICATOR	S.ESS.20.3.	resources

INDICATOR	S.ESS.20.4.	climate change.
CONTENT STANDARD / COURSE		**Biology**
CONTENT STANDARD / OBJECTIVE		**Engineering, Technology, and Applications of Science**
OBJECTIVE / EXPECTATION		**Engineering Design**
GRADE LEVEL EXPECTATION	S.B.23.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
GRADE LEVEL EXPECTATION	S.B.24.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
GRADE LEVEL EXPECTATION	S.B.25.	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 LEVEL EXPECTATION	S.B.26.	Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.
CONTENT STANDARD / COURSE		**Physical Science**
CONTENT STANDARD / OBJECTIVE		**Physical Science/Physics**
OBJECTIVE / EXPECTATION		**Energy**
GRADE LEVEL EXPECTATION	S.PS.17.	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		**Physical Science**
CONTENT STANDARD / OBJECTIVE		**Engineering, Technology, and Application of Science**
OBJECTIVE / EXPECTATION		**Engineering Design**
GRADE LEVEL EXPECTATION	S.PS.30.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
GRADE LEVEL EXPECTATION	S.PS.31.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
GRADE LEVEL EXPECTATION	S.PS.32.	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.

CONTENT STANDARD / COURSE		**Chemistry**
CONTENT STANDARD / OBJECTIVE		**Engineering, Technology, and Applications of Science**
OBJECTIVE / EXPECTATION		**Engineering Design**
GRADE LEVEL EXPECTATION	S.C.28.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
GRADE LEVEL EXPECTATION	S.C.30.	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.
CONTENT STANDARD / COURSE		**Physics**
CONTENT STANDARD / OBJECTIVE		**Physics/Physical Science**
OBJECTIVE / EXPECTATION		**Energy**
GRADE LEVEL EXPECTATION	S.P.14.	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		**Physics**
CONTENT STANDARD / OBJECTIVE		**Engineering, Technology, and Applications of Science**
OBJECTIVE / EXPECTATION		**Engineering Design**
GRADE LEVEL EXPECTATION	S.P.33.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
GRADE LEVEL EXPECTATION	S.P.34.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
GRADE LEVEL EXPECTATION	S.P.35.	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.
CONTENT STANDARD / COURSE		**Environmental Science**
CONTENT STANDARD / OBJECTIVE		**Environmental Science/Life Science, Earth and Space Science, and Physical Science Domains**
OBJECTIVE / EXPECTATION	**S.ENV.11.**	**Relate habitat changes to plant and animal populations and climate influences:**

GRADE LEVEL EXPECTATION	S.ENV.11.4.	albedo
GRADE LEVEL EXPECTATION	S.ENV.11.5.	surface temperature.

CONTENT STANDARD / COURSE		**Environmental Science**
CONTENT STANDARD / OBJECTIVE		**Environmental Science/Life Science, Earth and Space Science, and Physical Science Domains**
OBJECTIVE / EXPECTATION	S.ENV.17.	Debate climate change as it relates to natural forces, greenhouse gases, human changes in atmospheric concentrations of greenhouse gases, and relevant laws and treaties.

CONTENT STANDARD / COURSE		**Environmental Science**
CONTENT STANDARD / OBJECTIVE		**Engineering, Technology, and Applications of Science**
OBJECTIVE / EXPECTATION		**Engineering Design**
GRADE LEVEL EXPECTATION	S.ENV.28.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
GRADE LEVEL EXPECTATION	S.ENV.30.	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.

CONTENT STANDARD / COURSE		**Forensic Science**
CONTENT STANDARD / OBJECTIVE		**Engineering, Technology, and Applications of Science**
OBJECTIVE / EXPECTATION		**Engineering Design**
GRADE LEVEL EXPECTATION	S.FS.21.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
GRADE LEVEL EXPECTATION	S.FS.22.	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.

West Virginia College and Career Readiness Standards

Science

Grade **12** - Adopted: **2021**

CONTENT STANDARD / COURSE		**Science Indicators Grades 9-12**
CONTENT STANDARD / OBJECTIVE		**College- and Career-Readiness Indicators for Science**

OBJECTIVE / EXPECTATION		**Practices of Scientists and Engineers**
GRADE LEVEL EXPECTATION		Developing and using models
GRADE LEVEL EXPECTATION		Constructing explanations and designing solutions
GRADE LEVEL EXPECTATION		Obtaining, evaluating, and communicating information
CONTENT STANDARD / COURSE		**Science Indicators Grades 9-12**
CONTENT STANDARD / OBJECTIVE		**College- and Career-Readiness Indicators for Science**
OBJECTIVE / EXPECTATION		**Science Connecting Concepts**
GRADE LEVEL EXPECTATION		Investigating and explaining cause and effect
CONTENT STANDARD / COURSE		**Science Indicators Grades 9-12**
CONTENT STANDARD / OBJECTIVE		**College- and Career-Readiness Indicators for Science**
OBJECTIVE / EXPECTATION		**Science Literacy**
GRADE LEVEL EXPECTATION		Reading with understanding articles about science in the popular press and engaging in social conversation about the validity of the conclusions
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Earth's Systems**
OBJECTIVE / EXPECTATION	**S.ESS.8.**	**Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.**
GRADE LEVEL EXPECTATION	**S.ESS.8.2.**	**examples could include:**
INDICATOR	S.ESS.8.2.b.	greenhouse gasses
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Weather and Climate**

OBJECTIVE / EXPECTATION	**S.ESS.13.**	**Use a model to describe how variations in the flow of energy into and out of Earth systems result in changes in climate.**
GRADE LEVEL EXPECTATION	S.ESS.13.1.	changes in climate
GRADE LEVEL EXPECTATION	S.ESS.13.6.	atmospheric composition.
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Human Sustainability**
OBJECTIVE / EXPECTATION	**S.ESS.15.**	**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. Examples include:**
GRADE LEVEL EXPECTATION	S.ESS.15.3.	fossil fuels and mining
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Human Sustainability**
OBJECTIVE / EXPECTATION	**S.ESS.16.**	**Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.**
GRADE LEVEL EXPECTATION	S.ESS.16.1.	conservation, reuse, recycling
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Human Sustainability**
OBJECTIVE / EXPECTATION	**S.ESS.17.**	**Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.**
GRADE LEVEL EXPECTATION	S.ESS.17.4.	new technology development.
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Human Sustainability**
OBJECTIVE / EXPECTATION	**S.ESS.18.**	**Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.**
GRADE LEVEL EXPECTATION	**S.ESS.18.2.**	**deducing impact examples include:**

INDICATOR	S.ESS.18.2.c.	geoengineering design solutions.
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Human Sustainability**
OBJECTIVE / EXPECTATION	**S.ESS.19.**	**Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.**
GRADE LEVEL EXPECTATION	S.ESS.19.3.	cryosphere
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Engineering, Technology, and Applications of Science**
OBJECTIVE / EXPECTATION		**Engineering Design**
GRADE LEVEL EXPECTATION	**S.ESS.20.**	**Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. In reference to:**
INDICATOR	S.ESS.20.3.	resources
INDICATOR	S.ESS.20.4.	climate change.
CONTENT STANDARD / COURSE		**Biology**
CONTENT STANDARD / OBJECTIVE		**Engineering, Technology, and Applications of Science**
OBJECTIVE / EXPECTATION		**Engineering Design**
GRADE LEVEL EXPECTATION	S.B.23.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
GRADE LEVEL EXPECTATION	S.B.24.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
GRADE LEVEL EXPECTATION	S.B.25.	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 LEVEL EXPECTATION	S.B.26.	Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

CONTENT STANDARD / COURSE		**Physical Science**
CONTENT STANDARD / OBJECTIVE		**Physical Science/Physics**
OBJECTIVE / EXPECTATION		**Energy**
GRADE LEVEL EXPECTATION	S.PS.17.	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		**Physical Science**
CONTENT STANDARD / OBJECTIVE		**Engineering, Technology, and Application of Science**
OBJECTIVE / EXPECTATION		**Engineering Design**
GRADE LEVEL EXPECTATION	S.PS.30.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
GRADE LEVEL EXPECTATION	S.PS.31.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
GRADE LEVEL EXPECTATION	S.PS.32.	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.
CONTENT STANDARD / COURSE		**Chemistry**
CONTENT STANDARD / OBJECTIVE		**Engineering, Technology, and Applications of Science**
OBJECTIVE / EXPECTATION		**Engineering Design**
GRADE LEVEL EXPECTATION	S.C.28.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
GRADE LEVEL EXPECTATION	S.C.30.	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.
CONTENT STANDARD / COURSE		**Physics**
CONTENT STANDARD / OBJECTIVE		**Physics/Physical Science**
OBJECTIVE / EXPECTATION		**Energy**

GRADE LEVEL EXPECTATION	S.P.14.	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		**Physics**
CONTENT STANDARD / OBJECTIVE		**Engineering, Technology, and Applications of Science**
OBJECTIVE / EXPECTATION		**Engineering Design**
GRADE LEVEL EXPECTATION	S.P.33.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
GRADE LEVEL EXPECTATION	S.P.34.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
GRADE LEVEL EXPECTATION	S.P.35.	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.

CONTENT STANDARD / COURSE		**Environmental Science**
CONTENT STANDARD / OBJECTIVE		**Environmental Science/Life Science, Earth and Space Science, and Physical Science Domains**
OBJECTIVE / EXPECTATION	**S.ENV.11.**	**Relate habitat changes to plant and animal populations and climate influences:**
GRADE LEVEL EXPECTATION	S.ENV.11.4.	albedo
GRADE LEVEL EXPECTATION	S.ENV.11.5.	surface temperature.

CONTENT STANDARD / COURSE		**Environmental Science**
CONTENT STANDARD / OBJECTIVE		**Environmental Science/Life Science, Earth and Space Science, and Physical Science Domains**
OBJECTIVE / EXPECTATION	S.ENV.17.	Debate climate change as it relates to natural forces, greenhouse gases, human changes in atmospheric concentrations of greenhouse gases, and relevant laws and treaties.

CONTENT STANDARD / COURSE		**Environmental Science**
CONTENT STANDARD / OBJECTIVE		**Engineering, Technology, and Applications of Science**
OBJECTIVE / EXPECTATION		**Engineering Design**

GRADE LEVEL EXPECTATION	S.ENV.28.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
GRADE LEVEL EXPECTATION	S.ENV.30.	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.
CONTENT STANDARD / COURSE		**Forensic Science**
CONTENT STANDARD / OBJECTIVE		**Engineering, Technology, and Applications of Science**
OBJECTIVE / EXPECTATION		**Engineering Design**
GRADE LEVEL EXPECTATION	S.FS.21.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
GRADE LEVEL EXPECTATION	S.FS.22.	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.

West Virginia College and Career Readiness Standards

Technology Education

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

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Computer Science 9-12**
OBJECTIVE / EXPECTATION		**Data and Information**
GRADE LEVEL EXPECTATION	CS.9-12.7.	Create computational models for simulating real-world system.
CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Computer Science 9-12**
OBJECTIVE / EXPECTATION		**Impacts of Computing**
GRADE LEVEL EXPECTATION	CS.9-12.13.	Test and refine computational artifacts to reduce bias and equity deficits.
CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Computer Science in the Modern World**

OBJECTIVE / EXPECTATION		**Computer Systems and Computational Thinking**
GRADE LEVEL EXPECTATION	CS.MW.3.	Explain how sequence, selection, iteration, and recursion are building blocks of algorithms.
GRADE LEVEL EXPECTATION	CS.MW.8.	Use modeling and simulation to represent and understand natural phenomena.
CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Computer Science in the Modern World**
OBJECTIVE / EXPECTATION		**Programming and Algorithms**
GRADE LEVEL EXPECTATION	CS.MW.22.	Describe a variety of programming languages available to solve problems and develop systems.
CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Computer Science & Mathematics**
OBJECTIVE / EXPECTATION		**Computer Systems and Computational Thinking**
GRADE LEVEL EXPECTATION		**Connect the development cycle of algorithm construction to problem-solving.**
INDICATOR	CS.M.9.	Create systems of equations based on real-world situations.
CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Computer Science & Mathematics**
OBJECTIVE / EXPECTATION		**Computer Systems and Computational Thinking**
GRADE LEVEL EXPECTATION		**Create and evaluate algorithms to solve problems.**
INDICATOR	CS.M.11.	Utilize modeling and simulation techniques to represent and understand natural phenomena.
INDICATOR	CS.M.13.	Manipulate formulas and equations and apply them to algorithm development.
INDICATOR	CS.M.15.	Write algorithms to solve mathematical problems using formulas, equations, and functions.
INDICATOR	CS.M.16.	Implement conditional statements that include if/then, if/then/else, case statements, and Boolean logic, in the design of algorithms.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Introduction to Geographic Information Systems**
OBJECTIVE / EXPECTATION		**Computer Systems and Computational Thinking**
GRADE LEVEL EXPECTATION	CS.GIS.1.	Demonstrate an understanding of the basics of cartography.
GRADE LEVEL EXPECTATION	CS.GIS.2.	Demonstrate a basic proficiency in map reading; an understanding of scale; an understanding of the power of analysis; and an understanding of the history of map creation and use.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Introduction to Geographic Information Systems**
OBJECTIVE / EXPECTATION		**Programming and Algorithms**
GRADE LEVEL EXPECTATION	CS.GIS.9.	Use a web-based GIS to answer questions about the earth and the environment.
GRADE LEVEL EXPECTATION	CS.GIS.10.	Demonstrate basic proficiency in map creation, including adding layers, adding additional data, changing data symbology, configuring pop-up, saving and sharing maps.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Introduction to Geographic Information Systems**
OBJECTIVE / EXPECTATION		**Programming and Algorithms**
GRADE LEVEL EXPECTATION	**CS.GIS.11.**	**Use geospatial technology to explore and investigate environmental problems such as:**
INDICATOR	CS.GIS.11.a.	resource management

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Introduction to Geographic Information Systems**
OBJECTIVE / EXPECTATION		**Programming and Algorithms**
GRADE LEVEL EXPECTATION	**CS.GIS.12.**	**Use geospatial technology to explore and investigate rural and urban issues such as:**

INDICATOR	CS.GIS.12.a.	urban planning
INDICATOR	CS.GIS.12.b.	transportation
INDICATOR	CS.GIS.12.c.	logistics
INDICATOR	CS.GIS.12.d.	emergency planning to calculate emergency response times in the event of a natural disaster.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Introduction to Geographic Information Systems**
OBJECTIVE / EXPECTATION		**Programming and Algorithms**
GRADE LEVEL EXPECTATION	CS.GIS.13.	Explore uses of geospatial technology by law enforcement to map, visualize, and analyze crime incident patterns.
GRADE LEVEL EXPECTATION	CS.GIS.14.	Use geospatial technology to explore and investigate business problems related to asset management.
GRADE LEVEL EXPECTATION	CS.GIS.15.	Use geospatial technology to explore and investigate problems related to medical geography and epidemiology.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Introduction to Geographic Information Systems**
OBJECTIVE / EXPECTATION		**Impacts of Computing**
GRADE LEVEL EXPECTATION	CS.GIS.19.	Use geospatial technology to explore and investigate the history of cartography.

West Virginia College and Career Readiness Standards

Technology Education

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

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Computer Science 9-12**
OBJECTIVE / EXPECTATION		**Data and Information**

GRADE LEVEL EXPECTATION	CS.9-12.7.	Create computational models for simulating real-world system.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Computer Science 9-12**
OBJECTIVE / EXPECTATION		**Impacts of Computing**

GRADE LEVEL EXPECTATION	CS.9-12.13.	Test and refine computational artifacts to reduce bias and equity deficits.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Computer Science in the Modern World**
OBJECTIVE / EXPECTATION		**Computer Systems and Computational Thinking**

GRADE LEVEL EXPECTATION	CS.MW.3.	Explain how sequence, selection, iteration, and recursion are building blocks of algorithms.

GRADE LEVEL EXPECTATION	CS.MW.8.	Use modeling and simulation to represent and understand natural phenomena.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Computer Science in the Modern World**
OBJECTIVE / EXPECTATION		**Programming and Algorithms**

GRADE LEVEL EXPECTATION	CS.MW.22.	Describe a variety of programming languages available to solve problems and develop systems.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Computer Science & Mathematics**
OBJECTIVE / EXPECTATION		**Computer Systems and Computational Thinking**
GRADE LEVEL EXPECTATION		**Connect the development cycle of algorithm construction to problem-solving.**

INDICATOR	CS.M.9.	Create systems of equations based on real-world situations.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Computer Science & Mathematics**
OBJECTIVE / EXPECTATION		**Computer Systems and Computational Thinking**
GRADE LEVEL EXPECTATION		**Create and evaluate algorithms to solve problems.**
INDICATOR	CS.M.11.	Utilize modeling and simulation techniques to represent and understand natural phenomena.
INDICATOR	CS.M.13.	Manipulate formulas and equations and apply them to algorithm development.
INDICATOR	CS.M.15.	Write algorithms to solve mathematical problems using formulas, equations, and functions.
INDICATOR	CS.M.16.	Implement conditional statements that include if/then, if/then/else, case statements, and Boolean logic, in the design of algorithms.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Introduction to Geographic Information Systems**
OBJECTIVE / EXPECTATION		**Computer Systems and Computational Thinking**
GRADE LEVEL EXPECTATION	CS.GIS.1.	Demonstrate an understanding of the basics of cartography.
GRADE LEVEL EXPECTATION	CS.GIS.2.	Demonstrate a basic proficiency in map reading; an understanding of scale; an understanding of the power of analysis; and an understanding of the history of map creation and use.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Introduction to Geographic Information Systems**
OBJECTIVE / EXPECTATION		**Programming and Algorithms**
GRADE LEVEL EXPECTATION	CS.GIS.9.	Use a web-based GIS to answer questions about the earth and the environment.
GRADE LEVEL EXPECTATION	CS.GIS.10.	Demonstrate basic proficiency in map creation, including adding layers, adding additional data, changing data symbology, configuring pop-up, saving and sharing maps.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**

CONTENT STANDARD / OBJECTIVE		**Introduction to Geographic Information Systems**
OBJECTIVE / EXPECTATION		**Programming and Algorithms**
GRADE LEVEL EXPECTATION	**CS.GIS.11.**	**Use geospatial technology to explore and investigate environmental problems such as:**
INDICATOR	CS.GIS.11.a.	resource management

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Introduction to Geographic Information Systems**
OBJECTIVE / EXPECTATION		**Programming and Algorithms**
GRADE LEVEL EXPECTATION	**CS.GIS.12.**	**Use geospatial technology to explore and investigate rural and urban issues such as:**
INDICATOR	CS.GIS.12.a.	urban planning
INDICATOR	CS.GIS.12.b.	transportation
INDICATOR	CS.GIS.12.c.	logistics
INDICATOR	CS.GIS.12.d.	emergency planning to calculate emergency response times in the event of a natural disaster.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Introduction to Geographic Information Systems**
OBJECTIVE / EXPECTATION		**Programming and Algorithms**
GRADE LEVEL EXPECTATION	CS.GIS.13.	Explore uses of geospatial technology by law enforcement to map, visualize, and analyze crime incident patterns.
GRADE LEVEL EXPECTATION	CS.GIS.14.	Use geospatial technology to explore and investigate business problems related to asset management.
GRADE LEVEL EXPECTATION	CS.GIS.15.	Use geospatial technology to explore and investigate problems related to medical geography and epidemiology.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**

CONTENT STANDARD / OBJECTIVE		**Introduction to Geographic Information Systems**
OBJECTIVE / EXPECTATION		**Impacts of Computing**
GRADE LEVEL EXPECTATION	CS.GIS.1 9.	Use geospatial technology to explore and investigate the history of cartography.