Main Criteria: Forward Education
Secondary Criteria: Colorado Academic Standards (CAS)
Subjects: Mathematics, Science, Technology Education
Grades: 11, 12, Key Stage 4

Forward Education

Autonomous Electric Vehicles of the Future

Colorado Academic Standards (CAS)
Mathematics
Grade **11** - Adopted: **2018**

CONTENT AREA		Prepared Graduates in Mathematics
STANDARD	MP1.	Make sense of problems and persevere in solving them.
STANDARD	MP2.	Reason abstractly and quantitatively.
STANDARD	MP3.	Construct viable arguments and critique the reasoning of others.
STANDARD	MP4.	Model with mathematics.
STANDARD	MP8.	Look for and express regularity in repeated reasoning.

CONTENT AREA		High School, Standard 2. Algebra and Functions
STANDARD	**HS.A-CED.A.**	**Creating Equations: Create equations that describe numbers or relationships.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES	HS.A-CED.A.2.	Create equations in two or more variables to represent relationships between quantities and graph equations on coordinate axes with labels and scales. (CCSS: HS.A-CED.A.2)

CONTENT AREA		High School, Standard 2. Algebra and Functions
STANDARD	**HS.A-REI.A.**	**Reasoning with Equations & Inequalities: Understand solving equations as a process of reasoning and explain the reasoning.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES	HS.A-REI.A.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. (CCSS: HS.A-REI.A.1)

CONTENT AREA		High School, Standard 2. Algebra and Functions
STANDARD	**HS.F-IF.B.**	**Interpreting Functions: Interpret functions that arise in applications in terms of the context.**

CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES	HS.F-IF.B.6.	Calculate and interpret the average rate of change presented symbolically or as a table, of a function over a specified interval. Estimate the rate of change from a graph. (CCSS: HS.F-IF.B.6)
CONTENT AREA		**High School, Standard 2. Algebra and Functions**
STANDARD	**HS.F-IF.C.**	**Interpreting Functions: Analyze functions using different representations.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES	**HS.F-IF.C.7.**	**Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. (CCSS: HS.F-IF.C.7)**
INDICATOR	HS.F-IF.C.7.a.	Graph linear and quadratic functions and show intercepts, maxima, and minima. (CCSS: HS.F-IF.C.7.a)
CONTENT AREA		**High School, Standard 2. Algebra and Functions**
STANDARD	**HS.F-LE.A.**	**Linear, Quadratic & Exponential Models: Construct and compare linear, quadratic, and exponential models and solve problems.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES	**HS.F-LE.A.1.**	**Distinguish between situations that can be modeled with linear functions and with exponential functions. (CCSS: HS.F-LE.A.1)**
INDICATOR	HS.F-LE.A.1.a.	Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. (CCSS: HS.F-LE.A.1.a)
CONTENT AREA		**High School, Standard 4. Geometry**
STANDARD	**HS.G-GPE.B.**	**Expressing Geometric Properties with Equations: Use coordinates to prove simple geometric theorems algebraically.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	HS.G-GPE.B.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). (CCSS: HS.G-GPE.B.5)

Colorado Academic Standards (CAS)

Mathematics

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

CONTENT AREA		**Prepared Graduates in Mathematics**
STANDARD	MP1.	Make sense of problems and persevere in solving them.

STANDARD	MP2.	Reason abstractly and quantitatively.
STANDARD	MP3.	Construct viable arguments and critique the reasoning of others.
STANDARD	MP4.	Model with mathematics.
STANDARD	MP8.	Look for and express regularity in repeated reasoning.

CONTENT AREA		**High School, Standard 2. Algebra and Functions**
STANDARD	**HS.A-CED.A.**	**Creating Equations: Create equations that describe numbers or relationships.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES	HS.A-CED.A.2.	Create equations in two or more variables to represent relationships between quantities and graph equations on coordinate axes with labels and scales. (CCSS: HS.A-CED.A.2)

CONTENT AREA		**High School, Standard 2. Algebra and Functions**
STANDARD	**HS.A-REI.A.**	**Reasoning with Equations & Inequalities: Understand solving equations as a process of reasoning and explain the reasoning.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES	HS.A-REI.A.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. (CCSS: HS.A-REI.A.1)

CONTENT AREA		**High School, Standard 2. Algebra and Functions**
STANDARD	**HS.F-IF.B.**	**Interpreting Functions: Interpret functions that arise in applications in terms of the context.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES	HS.F-IF.B.6.	Calculate and interpret the average rate of change presented symbolically or as a table, of a function over a specified interval. Estimate the rate of change from a graph. (CCSS: HS.F-IF.B.6)

CONTENT AREA		**High School, Standard 2. Algebra and Functions**
STANDARD	**HS.F-IF.C.**	**Interpreting Functions: Analyze functions using different representations.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES	**HS.F-IF.C.7.**	**Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. (CCSS: HS.F-IF.C.7)**

INDICATOR	HS.F-IF.C.7.a.	Graph linear and quadratic functions and show intercepts, maxima, and minima. (CCSS: HS.F-IF.C.7.a)

CONTENT AREA		**High School, Standard 2. Algebra and Functions**
STANDARD	**HS.F-LE.A.**	**Linear, Quadratic & Exponential Models: Construct and compare linear, quadratic, and exponential models and solve problems.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES	**HS.F-LE.A.1.**	**Distinguish between situations that can be modeled with linear functions and with exponential functions. (CCSS: HS.F-LE.A.1)**
INDICATOR	HS.F-LE.A.1.a.	Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. (CCSS: HS.F-LE.A.1.a)

CONTENT AREA		**High School, Standard 4. Geometry**
STANDARD	**HS.G-GPE.B.**	**Expressing Geometric Properties with Equations: Use coordinates to prove simple geometric theorems algebraically.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	HS.G-GPE.B.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). (CCSS: HS.G-GPE.B.5)

Colorado Academic Standards (CAS)

Science

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

CONTENT AREA		**Prepared Graduates in Science**
STANDARD	1	Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding structure, properties and interactions of matter.
STANDARD	2	Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding interactions between objects and within systems of objects.
STANDARD	3	Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how energy is transferred and conserved.
STANDARD	4	Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how waves are used to transfer energy and information.
STANDARD	5	Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how individual organisms are configured and how these structures function to support life, growth, behavior and reproduction.
STANDARD	6	Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how living systems interact with the biotic and abiotic environment.

STANDARD	7	Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how genetic and environmental factors influence variation of organisms across generations.
STANDARD	8	Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how natural selection drives biological evolution accounting for the unity and diversity of organisms.
STANDARD	9	Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding the universe and Earth's place in it.
STANDARD	10	Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how and why Earth is constantly changing.
STANDARD	11	Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how human activities and the Earth's surface processes interact.

CONTENT AREA	**SC.HS.1.**	**Physical Science**
STANDARD	**SC.HS.1.1.**	**The sub-atomic structural model and interactions between electric charges at the atomic scale can be used to explain the structure and interactions of matter.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	SC.HS.1.1.c.	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. (HS-PS1-4)

CONTENT AREA	**SC.HS.1.**	**Physical Science**
STANDARD	**SC.HS.1.2.**	**Chemical processes, their rates, their outcomes, and whether or not energy is stored or released can be understood in terms of collisions of molecules, rearrangement of atoms, and changes in energy as determined by properties of elements involved.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	SC.HS.1.2.b.	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. (HS-PS1-4)

CONTENT AREA	**SC.HS.1.**	**Physical Science**
STANDARD	**SC.HS.1.6.**	**Energy is a quantitative property of a system that depends on the motion and interactions of matter and radiation within that system.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**

INDICATOR	SC.HS.1.6.c.	Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy. (HS-PS3-3)

CONTENT AREA	**SC.HS.1.**	**Physical Science**
STANDARD	**SC.HS.1.9.**	**Although energy cannot be destroyed, it can be converted to less useful forms as it is captured, stored and transferred.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**

INDICATOR	SC.HS.1.9.a.	Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy. (HS-PS3-3)

CONTENT AREA	**SC.HS.1.**	**Physical Science**
STANDARD	**SC.HS.1.10.**	**Waves have characteristic properties and behaviors.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**

INDICATOR	SC.HS.1.10.b.	Evaluate questions about the advantages of using a digital transmission and storage of information. (HS-PS4-2)

CONTENT AREA	**SC.HS.2.**	**Life Science**
STANDARD	**SC.HS.2.6.**	**A complex set of interactions determine how ecosystems respond to disturbances.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**

INDICATOR	SC.HS.2.6.b.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity. (HS-LS2-7)

CONTENT AREA	**SC.HS.3.**	**Earth and Space Science**
STANDARD	**SC.HS.3.4.**	**Earth's systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes, and these effects occur on different time scales, from sudden (e.g., volcanic ash clouds) to intermediate (ice ages) to very long-term tectonic cycles.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**

INDICATOR	SC.HS.3.4.d.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate. (HS-ESS2-4)

CONTENT AREA	**SC.HS.3.**	**Earth and Space Science**
STANDARD	**SC.HS.3.7.**	**The role of radiation from the sun and its interactions with the atmosphere, ocean, and land are the foundation for the global climate system. Global climate models are used to predict future changes, including changes influenced by human behavior and natural factors.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	SC.HS.3.7.b.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate. (HS-ESS2-4)

CONTENT AREA	**SC.HS.3.**	**Earth and Space Science**
STANDARD	**SC.HS.3.9.**	**Resource availability has guided the development of human society and use of natural resources has associated costs, risks, and benefits.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	SC.HS.3.9.a.	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. (HS-ESS3-1)
INDICATOR	SC.HS.3.9.b.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios. (HS-ESS3-2)

CONTENT AREA	**SC.HS.3.**	**Earth and Space Science**
STANDARD	**SC.HS.3.10.**	**Natural hazards and other geological events have shaped the course of human history at local, regional, and global scales.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	SC.HS.3.10.a.	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. (HS-ESS3-1)

CONTENT AREA	**SC.HS.3.**	**Earth and Space Science**
STANDARD	**SC.HS.3.11.**	**Sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources, including the development of technologies.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**

EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	SC.HS.3.11.a.	Create a computational simulation to illustrate the relationships among the management of natural resources, the sustainability of human populations, and biodiversity. (HS-ESS3-3)
INDICATOR	SC.HS.3.11.b.	Evaluate or refine a technological solution that reduces impacts of human activities on natural systems. (HS-ESS3-4)
CONTENT AREA	**SC.HS.3.**	**Earth and Space Science**
STANDARD	**SC.HS.3.12.**	**Global climate models used to predict future climate change continue to improve our understanding of the impact of human activities on the global climate system.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	SC.HS.3.12.b.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity. (HS-ESS3-6)

Colorado Academic Standards (CAS)

Science

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

CONTENT AREA		**Prepared Graduates in Science**
STANDARD	1	Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding structure, properties and interactions of matter.
STANDARD	2	Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding interactions between objects and within systems of objects.
STANDARD	3	Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how energy is transferred and conserved.
STANDARD	4	Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how waves are used to transfer energy and information.
STANDARD	5	Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how individual organisms are configured and how these structures function to support life, growth, behavior and reproduction.
STANDARD	6	Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how living systems interact with the biotic and abiotic environment.
STANDARD	7	Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how genetic and environmental factors influence variation of organisms across generations.
STANDARD	8	Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how natural selection drives biological evolution accounting for the unity and diversity of organisms.

STANDARD	9	Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding the universe and Earth's place in it.
STANDARD	10	Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how and why Earth is constantly changing.
STANDARD	11	Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how human activities and the Earth's surface processes interact.

CONTENT AREA	**SC.HS.1.**	**Physical Science**
STANDARD	**SC.HS.1.1.**	**The sub-atomic structural model and interactions between electric charges at the atomic scale can be used to explain the structure and interactions of matter.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	SC.HS.1.1.c.	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. (HS-PS1-4)

CONTENT AREA	**SC.HS.1.**	**Physical Science**
STANDARD	**SC.HS.1.2.**	**Chemical processes, their rates, their outcomes, and whether or not energy is stored or released can be understood in terms of collisions of molecules, rearrangement of atoms, and changes in energy as determined by properties of elements involved.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	SC.HS.1.2.b.	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. (HS-PS1-4)

CONTENT AREA	**SC.HS.1.**	**Physical Science**
STANDARD	**SC.HS.1.6.**	**Energy is a quantitative property of a system that depends on the motion and interactions of matter and radiation within that system.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	SC.HS.1.6.c.	Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy. (HS-PS3-3)

CONTENT AREA	**SC.HS.1.**	**Physical Science**
STANDARD	**SC.HS.1.9.**	**Although energy cannot be destroyed, it can be converted to less useful forms as it is captured, stored and transferred.**

CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	SC.HS.1.9.a.	Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy. (HS-PS3-3)

CONTENT AREA	**SC.HS.1.**	**Physical Science**
STANDARD	**SC.HS.1.10.**	**Waves have characteristic properties and behaviors.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	SC.HS.1.10.b.	Evaluate questions about the advantages of using a digital transmission and storage of information. (HS-PS4-2)

CONTENT AREA	**SC.HS.2.**	**Life Science**
STANDARD	**SC.HS.2.6.**	**A complex set of interactions determine how ecosystems respond to disturbances.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	SC.HS.2.6.b.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity. (HS-LS2-7)

CONTENT AREA	**SC.HS.3.**	**Earth and Space Science**
STANDARD	**SC.HS.3.4.**	**Earth's systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes, and these effects occur on different time scales, from sudden (e.g., volcanic ash clouds) to intermediate (ice ages) to very long-term tectonic cycles.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	SC.HS.3.4.d.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate. (HS-ESS2-4)

CONTENT AREA	**SC.HS.3.**	**Earth and Space Science**
STANDARD	**SC.HS.3.7.**	**The role of radiation from the sun and its interactions with the atmosphere, ocean, and land are the foundation for the global climate system. Global climate models are used to predict future changes, including changes influenced by human behavior and natural factors.**

CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	SC.HS.3. 7.b.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate. (HS-ESS2-4)

CONTENT AREA	**SC.HS.3.**	**Earth and Space Science**
STANDARD	**SC.HS.3. 9.**	**Resource availability has guided the development of human society and use of natural resources has associated costs, risks, and benefits.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	SC.HS.3. 9.a.	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. (HS-ESS3-1)
INDICATOR	SC.HS.3. 9.b.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios. (HS-ESS3-2)

CONTENT AREA	**SC.HS.3.**	**Earth and Space Science**
STANDARD	**SC.HS.3. 10.**	**Natural hazards and other geological events have shaped the course of human history at local, regional, and global scales.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	SC.HS.3. 10.a.	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. (HS-ESS3-1)

CONTENT AREA	**SC.HS.3.**	**Earth and Space Science**
STANDARD	**SC.HS.3. 11.**	**Sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources, including the development of technologies.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	SC.HS.3. 11.a.	Create a computational simulation to illustrate the relationships among the management of natural resources, the sustainability of human populations, and biodiversity. (HS-ESS3-3)
INDICATOR	SC.HS.3. 11.b.	Evaluate or refine a technological solution that reduces impacts of human activities on natural systems. (HS-ESS3-4)

CONTENT AREA	**SC.HS.3.**	**Earth and Space Science**
STANDARD	**SC.HS.3.12.**	**Global climate models used to predict future climate change continue to improve our understanding of the impact of human activities on the global climate system.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	SC.HS.3.12.b.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity. (HS-ESS3-6)

Colorado Academic Standards (CAS)

Technology Education

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

CONTENT AREA		**Prepared Graduates in Computer Science**
STANDARD	1	Develop, utilize and evaluate algorithms, to model and solve problems.

CONTENT AREA		**High School, Standard 1. Computational Thinking**
STANDARD	**CS.HS.1.1**	**Computational thinking is used to create algorithmic solutions to real-world problems.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	CS.HS.1.1.a.	Identify and create different types of algorithms (sort, search, etc.).
INDICATOR	CS.HS.1.1.c.	Create or adapt algorithms to solve problems for multiple purposes (e.g., personal interests, client needs).
INDICATOR	CS.HS.1.1.f.	Recognize problems that cannot be solved computationally.
INDICATOR	CS.HS.1.1.g.	Identify and describe algorithms that exist within their personal lives.

CONTENT AREA		**High School, Standard 1. Computational Thinking**
STANDARD	**CS.HS.1.5**	**Abstraction is used to reduce complexity of larger problems by focusing on main ideas.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**

INDICATOR	CS.HS.1.5.a.	Describe how abstraction is central to computational thinking.
INDICATOR	CS.HS.1.5.b.	Identify and prioritize the most relevant parts of a problem while filtering out extraneous details.
INDICATOR	CS.HS.1.5.c.	Demonstrate different ways to represent key problem components.

CONTENT AREA		**High School, Standard 2. Computing Systems and Networks**
STANDARD	**CS.HS.2.5**	**Client considerations drive system design.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	CS.HS.2.5.a.	Identify client's problems/needs.
INDICATOR	CS.HS.2.5.b.	Articulate design requirements back to client.

CONTENT AREA		**High School, Standard 3. Computer Programming**
STANDARD	**CS.HS.3.1**	**The creation of a computer program requires a design process.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	CS.HS.3.1.a.	Analyze and apply a design methodology to identify constraints and requirements of an identified problem.

CONTENT AREA		**High School, Standard 3. Computer Programming**
STANDARD	**CS.HS.3.4**	**Client-based design requirements and feedback are essential to a quality computational product or service.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	CS.HS.3.4.a.	Understand and apply principles of client-based design.

CONTENT AREA		**Prepared Graduates in Computer Science**
STANDARD	1	Develop, utilize and evaluate algorithms, to model and solve problems.

CONTENT AREA		**High School, Standard 1. Computational Thinking**
STANDARD	**CS.HS.1.1**	**Computational thinking is used to create algorithmic solutions to real-world problems.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	CS.HS.1.1.a.	Identify and create different types of algorithms (sort, search, etc.).
INDICATOR	CS.HS.1.1.c.	Create or adapt algorithms to solve problems for multiple purposes (e.g., personal interests, client needs).
INDICATOR	CS.HS.1.1.f.	Recognize problems that cannot be solved computationally.
INDICATOR	CS.HS.1.1.g.	Identify and describe algorithms that exist within their personal lives.

CONTENT AREA		**High School, Standard 1. Computational Thinking**
STANDARD	**CS.HS.1.5**	**Abstraction is used to reduce complexity of larger problems by focusing on main ideas.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	CS.HS.1.5.a.	Describe how abstraction is central to computational thinking.
INDICATOR	CS.HS.1.5.b.	Identify and prioritize the most relevant parts of a problem while filtering out extraneous details.
INDICATOR	CS.HS.1.5.c.	Demonstrate different ways to represent key problem components.

CONTENT AREA		**High School, Standard 2. Computing Systems and Networks**
STANDARD	**CS.HS.2.5**	**Client considerations drive system design.**

CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	CS.HS.2.5.a.	Identify client's problems/needs.
INDICATOR	CS.HS.2.5.b.	Articulate design requirements back to client.

CONTENT AREA		**High School, Standard 3. Computer Programming**
STANDARD	**CS.HS.3.1**	**The creation of a computer program requires a design process.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	CS.HS.3.1.a.	Analyze and apply a design methodology to identify constraints and requirements of an identified problem.

CONTENT AREA		**High School, Standard 3. Computer Programming**
STANDARD	**CS.HS.3.4**	**Client-based design requirements and feedback are essential to a quality computational product or service.**
CONCEPTS AND SKILLS / EVIDENCE OUTCOMES		**Evidence Outcomes**
EVIDENCE OUTCOMES		**Students Can:**
INDICATOR	CS.HS.3.4.a.	Understand and apply principles of client-based design.