Main Criteria: Forward Education
Secondary Criteria: Georgia Standards of Excellence
Subjects: Mathematics, Science, Technology Education
Grades: 11, 12, Key Stage 4

Forward Education

Autonomous Electric Vehicles of the Future

Georgia Standards of Excellence
Mathematics
Grade **11** - Adopted: **2021**

STRAND/TOPIC		**Algebra: Concepts & Connections**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**
ELEMENT	**A.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**
ELEMENT/GLE	A.MM.1.1.	Explain applicable, mathematical problems using a mathematical model.

STRAND/TOPIC		**Algebra: Concepts & Connections**
STANDARD / DESCRIPTION		**FUNCTIONAL & GRAPHICAL REASONING – function notation, modeling linear functions, linear vs. nonlinear comparisons**
ELEMENT	**A.FGR.2:**	**Construct and interpret arithmetic sequences as functions, algebraically and graphically, to model and explain real-life phenomena. Use formal notation to represent linear functions and the key characteristics of graphs of linear functions, and informally compare linear and non-linear functions using parent graphs.**
ELEMENT/GLE	A.FGR.2.2.	Construct and interpret the graph of a linear function that models real-life phenomena and represent key characteristics of the graph using formal notation.

STRAND/TOPIC		**Advanced Algebra (Algebra II): Concepts and Connections**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**
ELEMENT	**AA.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**
ELEMENT/GLE	AA.MM.1.1.	Explain applicable, mathematical problems using a mathematical model.
ELEMENT/GLE	AA.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a mathematical, applicable situation.

STRAND/TOPIC		**Advanced Algebra (Algebra II): Concepts and Connections**
STANDARD / DESCRIPTION		**FUNCTIONAL & GRAPHICAL REASONING – exponential and logarithmic functions**
ELEMENT	**AA.FGR.3:**	**Explore and analyze structures and patterns for exponential and logarithmic functions and use exponential and logarithmic expressions, equations, and functions to model real-life phenomena.**
ELEMENT/GLE	AA.FGR.3.4.	Create exponential equations and use logarithms to solve mathematical, applicable problems for which only one variable is unknown.

STRAND/TOPIC		**Advanced Financial Algebra**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**

ELEMENT	**AFA.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**
ELEMENT/GLE	AFA.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.
ELEMENT/GLE	AFA.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	AFA.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.
ELEMENT/GLE	AFA.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.

STRAND/TOPIC		**Advanced Financial Algebra**
STANDARD / DESCRIPTION		**FUNCTIONAL & GRAPHICAL REASONING – Linear, Exponential, Quadratic, Cubic, Rational, Square Root, Greatest Integer, and Piecewise Functions**
ELEMENT	**AFA.FGR.3:**	**Explore and apply functions to model and explain real-life phenomena and to solve complex problems in business and financial contexts.**
ELEMENT/GLE	AFA.FGR.3.5.	Create, apply, and interpret linear functions to model real-world financial problems.

STRAND/TOPIC		**Advanced Financial Algebra**
STANDARD / DESCRIPTION		**DATA & STATISTICAL REASONING – Data Displays**
ELEMENT	**AFA.DSR.7:**	**Collect, analyze, interpret, summarize, and construct displays of data to make predictions within real-world applications.**
ELEMENT/GLE	AFA.DSR.7.8.	Apply the Arithmetic Average Formula to calculate and interpret a d-day simple moving average given a set of n data points, p(1), p(2), p(3), ..., p(n-1), p(n).

STRAND/TOPIC		**Advanced Financial Algebra**
STANDARD / DESCRIPTION		**DATA & STATISTICAL REASONING – Investigative Research**
ELEMENT	**AFA.DSR.8:**	**Conduct investigative research to solve real-life problems and answer statistical questions involved in business and financial decision-making.**
ELEMENT/GLE	AFA.DSR.8.1.	Identify a contextual, real-life problem that can be answered using investigative research.

STRAND/TOPIC		**Linear Algebra with Computer Science Applications**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**
ELEMENT	**LACS.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**
ELEMENT/GLE	LACS.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.

ELEMENT/GLE	LACS.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	LACS.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.
ELEMENT/GLE	LACS.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.
STRAND/TOPIC		**Geometry: Concepts & Connections**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**
ELEMENT	**G.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**
ELEMENT/GLE	G.MM.1.1.	Explain mathematically applicable problems using a mathematical model.
ELEMENT/GLE	G.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	G.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a mathematically applicable situation.
ELEMENT/GLE	G.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.
STRAND/TOPIC		**Advanced Finite Mathematics**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**
ELEMENT	**AFM.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**
ELEMENT/GLE	AFM.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.
ELEMENT/GLE	AFM.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	AFM.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.
ELEMENT/GLE	AFM.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.
STRAND/TOPIC		**Advanced Mathematical Decision Making**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**
ELEMENT	**AMDM.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**
ELEMENT/GLE	AMDM.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.

ELEMENT/GLE	AMDM.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	AMDM.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.
ELEMENT/GLE	AMDM.MM.1.4.	Use relevant information to create various mathematical representations and structures to solve real-life problems.
STRAND/TOPIC		**Advanced Mathematical Decision Making**
STANDARD / DESCRIPTION		**FUNCTIONAL & GRAPHICAL REASONING – Modeling with Functions**
ELEMENT	**AMDM.FGR.9:**	**Use functions to model problem situations in both discrete and continuous relationships.**
ELEMENT/GLE	AMDM.FGR.9.2.	Use linear, exponential, logistic, and piecewise functions to construct a model.
STRAND/TOPIC		**Precalculus**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**
ELEMENT	**PC.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**
ELEMENT/GLE	PC.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.
ELEMENT/GLE	PC.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	PC.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.
ELEMENT/GLE	PC.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.
STRAND/TOPIC		**Calculus**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**
ELEMENT	**C.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**
ELEMENT/GLE	C.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.
ELEMENT/GLE	C.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	C.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.
ELEMENT/GLE	C.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.

STRAND/TOPIC		Multivariable Calculus
STANDARD / DESCRIPTION		MATHEMATICAL MODELING
ELEMENT	MVC.MM.1:	Apply mathematics to real-life situations; model real-life phenomena using mathematics.
ELEMENT/GLE	MVC.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.
ELEMENT/GLE	MVC.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	MVC.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.
ELEMENT/GLE	MVC.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.

STRAND/TOPIC		Differential Equations
STANDARD / DESCRIPTION		MATHEMATICAL MODELING
ELEMENT	DE.MM.1:	Apply mathematics to real-life situations; model real-life phenomena using mathematics.
ELEMENT/GLE	DE.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.
ELEMENT/GLE	DE.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	DE.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.
ELEMENT/GLE	DE.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.

STRAND/TOPIC		Engineering Calculus
STANDARD / DESCRIPTION		MATHEMATICAL MODELING
ELEMENT	EC.MM.1:	Apply mathematics to real-life situations; model real-life phenomena using mathematics.
ELEMENT/GLE	EC.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.
ELEMENT/GLE	EC.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	EC.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.

ELEMENT/GLE	EC.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.
STRAND/TOPIC		**Engineering Calculus**
STANDARD / DESCRIPTION		**ABSTRACT REASONING – Impact of Engineering in Mathematics**
ELEMENT	**EC.AR.2:**	**Using the engineering design process, apply mathematical concepts and procedures to solve problems in engineering contexts and research the impact of engineering and technological advancement on mathematics and society.**
ELEMENT/GLE		**Solve and explain engineering-based calculus problems; use mathematical and engineering models to explain real-life phenomena, using appropriate terminology and technology.**
EXPECTATION	EC.AR.2.3.	Apply and adapt a variety of appropriate strategies to solve problems.
EXPECTATION	EC.AR.2.4.	Use visual and written communication to organize, record, and articulate coherent, mathematical thinking and to express basic design elements.
EXPECTATION	EC.AR.2.5.	Monitor and reflect on the process of mathematical problem solving and interpret solutions that arise in engineering contexts.
EXPECTATION	EC.AR.2.6.	Produce multiple representations for mathematics presented in engineering contexts.
EXPECTATION	EC.AR.2.8.	Use mathematical representations to model and interpret physical and engineering phenomena.
STRAND/TOPIC		**College Readiness Mathematics**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**
ELEMENT	**CRM.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**
ELEMENT/GLE	CRM.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.
ELEMENT/GLE	CRM.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	CRM.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.
ELEMENT/GLE	CRM.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.
STRAND/TOPIC		**Mathematics of Industry and Government**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**
ELEMENT	**MIG.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**

ELEMENT/GLE	MIG.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.
ELEMENT/GLE	MIG.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	MIG.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.
ELEMENT/GLE	MIG.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.
STRAND/TOPIC		**Statistical Reasoning**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**
ELEMENT	**SR.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**
ELEMENT/GLE	SR.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.
ELEMENT/GLE	SR.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or the humanities.
ELEMENT/GLE	SR.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a real-life situation.
ELEMENT/GLE	SR.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.
STRAND/TOPIC		**History of Mathematics**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**
ELEMENT	**HM.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**
ELEMENT/GLE	HM.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.
ELEMENT/GLE	HM.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	HM.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.
ELEMENT/GLE	HM.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.
STRAND/TOPIC		**History of Mathematics**
STANDARD / DESCRIPTION		**LOGICAL, MATHEMATICAL & INVESTIGATIVE REASONING – Ancient Greek Mathematics**

ELEMENT	**HM.LMIR.3:**	**Engage in the mathematical and cultural accomplishments of the ancient Greeks in order to grasp the foundational aspects of modern mathematics.**
ELEMENT/GLE		**Greek geometry**
EXPECTATION	HM.LMIR.3.1.	Prove statements in a deductive system by using its definitions, postulates, and axioms

Georgia Standards of Excellence

Mathematics

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

STRAND/TOPIC		**Algebra: Concepts & Connections**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**
ELEMENT	**A.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**
ELEMENT/GLE	A.MM.1.1.	Explain applicable, mathematical problems using a mathematical model.

STRAND/TOPIC		**Algebra: Concepts & Connections**
STANDARD / DESCRIPTION		**FUNCTIONAL & GRAPHICAL REASONING – function notation, modeling linear functions, linear vs. nonlinear comparisons**
ELEMENT	**A.FGR.2:**	**Construct and interpret arithmetic sequences as functions, algebraically and graphically, to model and explain real-life phenomena. Use formal notation to represent linear functions and the key characteristics of graphs of linear functions, and informally compare linear and non-linear functions using parent graphs.**
ELEMENT/GLE	A.FGR.2.2.	Construct and interpret the graph of a linear function that models real-life phenomena and represent key characteristics of the graph using formal notation.

STRAND/TOPIC		**Advanced Algebra (Algebra II): Concepts and Connections**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**
ELEMENT	**AA.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**
ELEMENT/GLE	AA.MM.1.1.	Explain applicable, mathematical problems using a mathematical model.
ELEMENT/GLE	AA.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a mathematical, applicable situation.

STRAND/TOPIC		**Advanced Algebra (Algebra II): Concepts and Connections**
STANDARD / DESCRIPTION		**FUNCTIONAL & GRAPHICAL REASONING – exponential and logarithmic functions**
ELEMENT	**AA.FGR.3:**	**Explore and analyze structures and patterns for exponential and logarithmic functions and use exponential and logarithmic expressions, equations, and functions to model real-life phenomena.**
ELEMENT/GLE	AA.FGR.3.4.	Create exponential equations and use logarithms to solve mathematical, applicable problems for which only one variable is unknown.

STRAND/TOPIC		**Advanced Financial Algebra**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**

ELEMENT	**AFA.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**
ELEMENT/GLE	AFA.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.
ELEMENT/GLE	AFA.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	AFA.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.
ELEMENT/GLE	AFA.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.

STRAND/TOPIC		**Advanced Financial Algebra**
STANDARD / DESCRIPTION		**FUNCTIONAL & GRAPHICAL REASONING – Linear, Exponential, Quadratic, Cubic, Rational, Square Root, Greatest Integer, and Piecewise Functions**
ELEMENT	**AFA.FGR.3:**	**Explore and apply functions to model and explain real-life phenomena and to solve complex problems in business and financial contexts.**
ELEMENT/GLE	AFA.FGR.3.5.	Create, apply, and interpret linear functions to model real-world financial problems.

STRAND/TOPIC		**Advanced Financial Algebra**
STANDARD / DESCRIPTION		**DATA & STATISTICAL REASONING – Data Displays**
ELEMENT	**AFA.DSR.7:**	**Collect, analyze, interpret, summarize, and construct displays of data to make predictions within real-world applications.**
ELEMENT/GLE	AFA.DSR.7.8.	Apply the Arithmetic Average Formula to calculate and interpret a d-day simple moving average given a set of n data points, p(1), p(2), p(3), ..., p(n-1), p(n).

STRAND/TOPIC		**Advanced Financial Algebra**
STANDARD / DESCRIPTION		**DATA & STATISTICAL REASONING – Investigative Research**
ELEMENT	**AFA.DSR.8:**	**Conduct investigative research to solve real-life problems and answer statistical questions involved in business and financial decision-making.**
ELEMENT/GLE	AFA.DSR.8.1.	Identify a contextual, real-life problem that can be answered using investigative research.

STRAND/TOPIC		**Linear Algebra with Computer Science Applications**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**
ELEMENT	**LACS.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**
ELEMENT/GLE	LACS.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.

ELEMENT/GLE	LACS.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	LACS.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.
ELEMENT/GLE	LACS.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.
STRAND/TOPIC		**Geometry: Concepts & Connections**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**
ELEMENT	**G.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**
ELEMENT/GLE	G.MM.1.1.	Explain mathematically applicable problems using a mathematical model.
ELEMENT/GLE	G.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	G.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a mathematically applicable situation.
ELEMENT/GLE	G.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.
STRAND/TOPIC		**Advanced Finite Mathematics**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**
ELEMENT	**AFM.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**
ELEMENT/GLE	AFM.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.
ELEMENT/GLE	AFM.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	AFM.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.
ELEMENT/GLE	AFM.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.
STRAND/TOPIC		**Advanced Mathematical Decision Making**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**
ELEMENT	**AMDM.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**
ELEMENT/GLE	AMDM.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.

ELEMENT/GLE	AMDM.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	AMDM.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.
ELEMENT/GLE	AMDM.MM.1.4.	Use relevant information to create various mathematical representations and structures to solve real-life problems.
STRAND/TOPIC		**Advanced Mathematical Decision Making**
STANDARD / DESCRIPTION		**FUNCTIONAL & GRAPHICAL REASONING – Modeling with Functions**
ELEMENT	**AMDM.FGR.9:**	**Use functions to model problem situations in both discrete and continuous relationships.**
ELEMENT/GLE	AMDM.FGR.9.2.	Use linear, exponential, logistic, and piecewise functions to construct a model.
STRAND/TOPIC		**Precalculus**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**
ELEMENT	**PC.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**
ELEMENT/GLE	PC.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.
ELEMENT/GLE	PC.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	PC.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.
ELEMENT/GLE	PC.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.
STRAND/TOPIC		**Calculus**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**
ELEMENT	**C.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**
ELEMENT/GLE	C.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.
ELEMENT/GLE	C.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	C.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.
ELEMENT/GLE	C.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.

STRAND/TOPIC		Multivariable Calculus
STANDARD / DESCRIPTION		MATHEMATICAL MODELING
ELEMENT	MVC.MM.1:	Apply mathematics to real-life situations; model real-life phenomena using mathematics.
ELEMENT/GLE	MVC.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.
ELEMENT/GLE	MVC.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	MVC.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.
ELEMENT/GLE	MVC.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.

STRAND/TOPIC		Differential Equations
STANDARD / DESCRIPTION		MATHEMATICAL MODELING
ELEMENT	DE.MM.1:	Apply mathematics to real-life situations; model real-life phenomena using mathematics.
ELEMENT/GLE	DE.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.
ELEMENT/GLE	DE.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	DE.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.
ELEMENT/GLE	DE.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.

STRAND/TOPIC		Engineering Calculus
STANDARD / DESCRIPTION		MATHEMATICAL MODELING
ELEMENT	EC.MM.1:	Apply mathematics to real-life situations; model real-life phenomena using mathematics.
ELEMENT/GLE	EC.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.
ELEMENT/GLE	EC.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	EC.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.

ELEMENT/GLE	EC.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.
STRAND/TOPIC		**Engineering Calculus**
STANDARD / DESCRIPTION		**ABSTRACT REASONING – Impact of Engineering in Mathematics**
ELEMENT	**EC.AR.2:**	**Using the engineering design process, apply mathematical concepts and procedures to solve problems in engineering contexts and research the impact of engineering and technological advancement on mathematics and society.**
ELEMENT/GLE		**Solve and explain engineering-based calculus problems; use mathematical and engineering models to explain real-life phenomena, using appropriate terminology and technology.**
EXPECTATION	EC.AR.2.3.	Apply and adapt a variety of appropriate strategies to solve problems.
EXPECTATION	EC.AR.2.4.	Use visual and written communication to organize, record, and articulate coherent, mathematical thinking and to express basic design elements.
EXPECTATION	EC.AR.2.5.	Monitor and reflect on the process of mathematical problem solving and interpret solutions that arise in engineering contexts.
EXPECTATION	EC.AR.2.6.	Produce multiple representations for mathematics presented in engineering contexts.
EXPECTATION	EC.AR.2.8.	Use mathematical representations to model and interpret physical and engineering phenomena.
STRAND/TOPIC		**College Readiness Mathematics**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**
ELEMENT	**CRM.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**
ELEMENT/GLE	CRM.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.
ELEMENT/GLE	CRM.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	CRM.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.
ELEMENT/GLE	CRM.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.
STRAND/TOPIC		**Mathematics of Industry and Government**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**
ELEMENT	**MIG.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**

ELEMENT/GLE	MIG.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.
ELEMENT/GLE	MIG.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	MIG.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.
ELEMENT/GLE	MIG.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.
STRAND/TOPIC		**Statistical Reasoning**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**
ELEMENT	**SR.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**
ELEMENT/GLE	SR.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.
ELEMENT/GLE	SR.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or the humanities.
ELEMENT/GLE	SR.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a real-life situation.
ELEMENT/GLE	SR.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.
STRAND/TOPIC		**History of Mathematics**
STANDARD / DESCRIPTION		**MATHEMATICAL MODELING**
ELEMENT	**HM.MM.1:**	**Apply mathematics to real-life situations; model real-life phenomena using mathematics.**
ELEMENT/GLE	HM.MM.1.1.	Explain contextual, mathematical problems using a mathematical model.
ELEMENT/GLE	HM.MM.1.2.	Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
ELEMENT/GLE	HM.MM.1.3.	Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.
ELEMENT/GLE	HM.MM.1.4.	Use various mathematical representations and structures with this information to represent and solve real-life problems.
STRAND/TOPIC		**History of Mathematics**
STANDARD / DESCRIPTION		**LOGICAL, MATHEMATICAL & INVESTIGATIVE REASONING – Ancient Greek Mathematics**

ELEMENT	**HM.LMIR.3:**	**Engage in the mathematical and cultural accomplishments of the ancient Greeks in order to grasp the foundational aspects of modern mathematics.**
ELEMENT/GLE		**Greek geometry**
EXPECTATION	HM.LMIR.3.1.	Prove statements in a deductive system by using its definitions, postulates, and axioms

Georgia Standards of Excellence

Science

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

STRAND/TOPIC	**40.05100.**	**Chemistry**
STANDARD / DESCRIPTION	**SC3.**	**Obtain, evaluate, and communicate information about how the Law of Conservation of Matter is used to determine chemical composition in compounds and chemical reactions.**
ELEMENT	SC3.a.	Use mathematics and computational thinking to balance chemical reactions (i.e., synthesis, decomposition, single replacement, double replacement, and combustion) and construct an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.
ELEMENT	SC3.b.	Plan and carry out an investigation to determine that a new chemical has been formed by identifying indicators of a chemical reaction (e.g., precipitate formation, gas evolution, color change, water production, and changes in energy to the system).
STRAND/TOPIC	**40.06400.**	**Earth Systems**
STANDARD / DESCRIPTION	**SES5.**	**Obtain, evaluate, and communicate information to investigate the interaction of solar energy and Earth's systems to produce weather and climate.**
ELEMENT	SES5.f.	Construct an argument relating changes in global climate to variation to Earth/sun relationships and atmospheric composition.
STRAND/TOPIC	**40.06400.**	**Earth Systems**
STANDARD / DESCRIPTION	**SES6.**	**Obtain, evaluate, and communicate information about how life on Earth responds to and shapes Earth's systems.**
ELEMENT	SES6.d.	Analyze and interpret data that relates changes in global climate to natural and anthropogenic modification of Earth's atmosphere and oceans.
STRAND/TOPIC	**26.06110.**	**Environmental Science**
STANDARD / DESCRIPTION	**SEV2.**	**Obtain, evaluate, and communicate information to construct explanations of stability and change in Earth's ecosystems.**
ELEMENT	SEV2.b.	Analyze and interpret data to determine how changes in atmospheric chemistry (carbon dioxide and methane) impact the greenhouse effect.
STRAND/TOPIC	**26.06110.**	**Environmental Science**
STANDARD / DESCRIPTION	**SEV3.**	**Obtain, evaluate, and communicate information to evaluate types, availability, allocation, and sustainability of energy resources.**
ELEMENT	SEV3.a.	Analyze and interpret data to communicate information on the origin and consumption of renewable forms of energy (wind, solar, geothermal, biofuel, and tidal) and non-renewable energy sources (fossil fuels and nuclear energy).

ELEMENT	SEV3.b.	Construct an argument based on data about the risks and benefits of renewable and nonrenewable energy sources.
ELEMENT	SEV3.c.	Obtain, evaluate, and communicate data to predict the sustainability potential of renewable and non-renewable energy resources.
ELEMENT	SEV3.d.	Design and defend a sustainable energy plan based on scientific principles for your location.
STRAND/TOPIC	**26.06110.**	**Environmental Science**
STANDARD / DESCRIPTION	**SEV4.**	**Obtain, evaluate, and communicate information to analyze human impact on natural resources.**
ELEMENT	SEV4.a.	Construct and revise a claim based on evidence on the effects of human activities on natural resources.
ELEMENT	SEV4.b.	Design, evaluate, and refine solutions to reduce human impact on the environment including, but not limited to, smog, ozone depletion, urbanization, and ocean acidification.
STRAND/TOPIC	**26.06110.**	**Environmental Science**
STANDARD / DESCRIPTION	**SEV5.**	**Obtain, evaluate, and communicate information about the effects of human population growth on global ecosystems.**
ELEMENT	SEV5.c.	Construct an argument from evidence regarding the ecological effects of human innovations (Agricultural, Industrial, Medical, and Technological Revolutions) on global ecosystems.
ELEMENT	SEV5.d.	Design and defend a sustainability plan to reduce your individual contribution to environmental impacts, taking into account how market forces and societal demands (including political, legal, social, and economic) influence personal choices.
STRAND/TOPIC	**40.01100.**	**Physical Science**
STANDARD / DESCRIPTION	**SPS10.**	**Obtain, evaluate, and communicate information to explain the properties of and relationships between electricity and magnetism.**
ELEMENT	SPS10.c.	Plan and carry out investigations to determine the relationship between magnetism and the movement of electrical charge.

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

STRAND/TOPIC	**26.06100.**	**Ecology (2019)**
STANDARD / DESCRIPTION	**SEC5.**	**Obtain, evaluate, and communicate information on the impact of natural and anthropogenic activities on ecological systems.**
ELEMENT	SEC5.b.	Construct an argument based on evidence to predict the impact of climate change on an ecosystem.
STRAND/TOPIC	**40.04100.**	**Meteorology (2019)**
STANDARD / DESCRIPTION	**SM2.**	**Obtain, evaluate, and communicate information about energy transfer and its role in precipitation, cloud formation, and air mass formation.**
ELEMENT	SM2.d.	Develop and use models to construct an explanation of the role that pressure differences have on energy transfer and the development of wind systems (e.g., sea breeze, land breeze, Hadley cells, Ferrel cells, prevailing winds, jet stream, ENSO, global scale winds).

STRAND/TOPIC	**40.04100.**	**Meteorology (2019)**
STANDARD / DESCRIPTION	**SM5.**	**Obtain, evaluate, and communicate information about climate and climate change.**
ELEMENT	SM5.b.	Ask questions and communicate information about factors impacting global climate change (e.g., Milankovitch and ENSO cycles, greenhouse gases, changes in physical geography).

STRAND/TOPIC	**26.07100.**	**Zoology (2019)**
STANDARD / DESCRIPTION	**SZ5.**	**Obtain, evaluate, and communicate information to analyze the relationship between humans and animals within various phyla.**
ELEMENT	SZ5.a.	Ask questions and define problems identifying the cause and effect of human activities on the biodiversity of organisms (including habitat destruction, overharvesting, water consumption, and pollution).
ELEMENT	SZ5.c.	Construct an argument based on evidence of the short-term and long-term impacts of legal, societal, political, ethical, and economic decisions on animal diversity.

Georgia Standards of Excellence

Science

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

STRAND/TOPIC	**40.05100.**	**Chemistry**
STANDARD / DESCRIPTION	**SC3.**	**Obtain, evaluate, and communicate information about how the Law of Conservation of Matter is used to determine chemical composition in compounds and chemical reactions.**
ELEMENT	SC3.a.	Use mathematics and computational thinking to balance chemical reactions (i.e., synthesis, decomposition, single replacement, double replacement, and combustion) and construct an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.
ELEMENT	SC3.b.	Plan and carry out an investigation to determine that a new chemical has been formed by identifying indicators of a chemical reaction (e.g., precipitate formation, gas evolution, color change, water production, and changes in energy to the system).

STRAND/TOPIC	**40.06400.**	**Earth Systems**
STANDARD / DESCRIPTION	**SES5.**	**Obtain, evaluate, and communicate information to investigate the interaction of solar energy and Earth's systems to produce weather and climate.**
ELEMENT	SES5.f.	Construct an argument relating changes in global climate to variation to Earth/sun relationships and atmospheric composition.

STRAND/TOPIC	**40.06400.**	**Earth Systems**
STANDARD / DESCRIPTION	**SES6.**	**Obtain, evaluate, and communicate information about how life on Earth responds to and shapes Earth's systems.**
ELEMENT	SES6.d.	Analyze and interpret data that relates changes in global climate to natural and anthropogenic modification of Earth's atmosphere and oceans.

STRAND/TOPIC	**26.06110.**	**Environmental Science**
STANDARD / DESCRIPTION	**SEV2.**	**Obtain, evaluate, and communicate information to construct explanations of stability and change in Earth's ecosystems.**

ELEMENT	SEV2.b.	Analyze and interpret data to determine how changes in atmospheric chemistry (carbon dioxide and methane) impact the greenhouse effect.
STRAND/TOPIC	**26.06110.**	**Environmental Science**
STANDARD / DESCRIPTION	**SEV3.**	**Obtain, evaluate, and communicate information to evaluate types, availability, allocation, and sustainability of energy resources.**
ELEMENT	SEV3.a.	Analyze and interpret data to communicate information on the origin and consumption of renewable forms of energy (wind, solar, geothermal, biofuel, and tidal) and non-renewable energy sources (fossil fuels and nuclear energy).
ELEMENT	SEV3.b.	Construct an argument based on data about the risks and benefits of renewable and nonrenewable energy sources.
ELEMENT	SEV3.c.	Obtain, evaluate, and communicate data to predict the sustainability potential of renewable and non-renewable energy resources.
ELEMENT	SEV3.d.	Design and defend a sustainable energy plan based on scientific principles for your location.
STRAND/TOPIC	**26.06110.**	**Environmental Science**
STANDARD / DESCRIPTION	**SEV4.**	**Obtain, evaluate, and communicate information to analyze human impact on natural resources.**
ELEMENT	SEV4.a.	Construct and revise a claim based on evidence on the effects of human activities on natural resources.
ELEMENT	SEV4.b.	Design, evaluate, and refine solutions to reduce human impact on the environment including, but not limited to, smog, ozone depletion, urbanization, and ocean acidification.
STRAND/TOPIC	**26.06110.**	**Environmental Science**
STANDARD / DESCRIPTION	**SEV5.**	**Obtain, evaluate, and communicate information about the effects of human population growth on global ecosystems.**
ELEMENT	SEV5.c.	Construct an argument from evidence regarding the ecological effects of human innovations (Agricultural, Industrial, Medical, and Technological Revolutions) on global ecosystems.
ELEMENT	SEV5.d.	Design and defend a sustainability plan to reduce your individual contribution to environmental impacts, taking into account how market forces and societal demands (including political, legal, social, and economic) influence personal choices.
STRAND/TOPIC	**40.01100.**	**Physical Science**
STANDARD / DESCRIPTION	**SPS10.**	**Obtain, evaluate, and communicate information to explain the properties of and relationships between electricity and magnetism.**
ELEMENT	SPS10.c.	Plan and carry out investigations to determine the relationship between magnetism and the movement of electrical charge.

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

STRAND/TOPIC	**26.06100.**	**Ecology (2019)**
STANDARD / DESCRIPTION	**SEC5.**	**Obtain, evaluate, and communicate information on the impact of natural and anthropogenic activities on ecological systems.**
ELEMENT	SEC5.b.	Construct an argument based on evidence to predict the impact of climate change on an ecosystem.

STRAND/TOPIC	**40.04100.**	**Meteorology (2019)**
STANDARD / DESCRIPTION	**SM2.**	**Obtain, evaluate, and communicate information about energy transfer and its role in precipitation, cloud formation, and air mass formation.**
ELEMENT	SM2.d.	Develop and use models to construct an explanation of the role that pressure differences have on energy transfer and the development of wind systems (e.g., sea breeze, land breeze, Hadley cells, Ferrel cells, prevailing winds, jet stream, ENSO, global scale winds).

STRAND/TOPIC	**40.04100.**	**Meteorology (2019)**
STANDARD / DESCRIPTION	**SM5.**	**Obtain, evaluate, and communicate information about climate and climate change.**
ELEMENT	SM5.b.	Ask questions and communicate information about factors impacting global climate change (e.g., Milankovitch and ENSO cycles, greenhouse gases, changes in physical geography).

STRAND/TOPIC	**26.07100.**	**Zoology (2019)**
STANDARD / DESCRIPTION	**SZ5.**	**Obtain, evaluate, and communicate information to analyze the relationship between humans and animals within various phyla.**
ELEMENT	SZ5.a.	Ask questions and define problems identifying the cause and effect of human activities on the biodiversity of organisms (including habitat destruction, overharvesting, water consumption, and pollution).
ELEMENT	SZ5.c.	Construct an argument based on evidence of the short-term and long-term impacts of legal, societal, political, ethical, and economic decisions on animal diversity.

Georgia Standards of Excellence

Technology Education

Grade **11** - Adopted: **2013**

STRAND/TOPIC		**Information Technology Career Cluster - Introduction to Digital Technology (Course Number 11.41500)**
STANDARD / DESCRIPTION	**IT-IDT-1.**	**Demonstrate employability skills required by business and industry.**
ELEMENT	IT-IDT-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.

STRAND/TOPIC		**Information Technology Career Cluster - Introduction to Cybersecurity (Course Number: 11.48100)**
STANDARD / DESCRIPTION	**IT-ICS-1.**	**Demonstrate employability skills required by business and industry.**
ELEMENT	IT-ICS-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.

STRAND/TOPIC		**Information Technology Career Cluster - Advanced Cybersecurity (Course Number: 11.48200)**
STANDARD / DESCRIPTION	**IT-ACS-1.**	**Demonstrate employability skills required by business and industry.**
ELEMENT	IT-ACS-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.

STRAND/TOPIC		**Information Technology Career Cluster - Computer Science Principles (Course Number: 11.47100)**

STANDARD / DESCRIPTION	**IT-CSP-1.**	**Demonstrate employability skills required by business and industry.**
ELEMENT	IT-CSP-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.
STRAND/TOPIC		**Information Technology Career Cluster - Computer Science Principles (Course Number: 11.47100)**
STANDARD / DESCRIPTION	**IT-CSP-5.**	**Develop, express, implement, and analyze algorithms analytically and empirically.**
ELEMENT	IT-CSP-5.1.	Develop an algorithm designed to be implemented to run on a computer.
ELEMENT	IT-CSP-5.2.	Explain the building blocks of algorithms: sequencing, selection, iteration, and recursion.
ELEMENT	IT-CSP-5.3.	Express an algorithm in a language.
ELEMENT	IT-CSP-5.5.	Connect problems to potential algorithmic solutions and explain an example of problems that cannot be solved using algorithms.
STRAND/TOPIC		**Information Technology Career Cluster - Computer Science Principles (Course Number: 11.47100)**
STANDARD / DESCRIPTION	**IT-CSP-6.**	**Create programs that translate human intention into computational artifacts including music, images, visualizations, and more while exploring the concepts, techniques and development used in writing programs.**
ELEMENT	IT-CSP-6.1.	Explain how programs implement algorithms.
STRAND/TOPIC		**Information Technology Career Cluster - Game Design: Animation and Simulation Course Number: 11.42900**
STANDARD / DESCRIPTION	**IT-GDAS-1.**	**Demonstrate employability skills required by business and industry.**
ELEMENT	IT-GDAS-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.
STRAND/TOPIC		**Information Technology Career Cluster - Embedded Computing (Course Number: 11.42700)**
STANDARD / DESCRIPTION	**IT-EP-1.**	**Demonstrate employability skills required by business and industry.**
ELEMENT	IT-EP-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.
STRAND/TOPIC		**Information Technology Career Cluster - Embedded Computing (Course Number: 11.42700)**
STANDARD / DESCRIPTION	**IT-EP-10.**	**Design an embedded computing application that solves a current problem (e.g., robotics, artbotics, visual, and kinetic art).**
ELEMENT	IT-EP-10.1.	Design, develop, and debug an embedded computing application interfacing to an external sensor, switch, LED, or other device.

STRAND/TOPIC		Information Technology Career Cluster - Programming, Games, Apps, and Society (Course Number: 11.47200)
STANDARD / DESCRIPTION	IT-PGAS-1.	Demonstrate employability skills required by business and industry.
ELEMENT	IT-PGAS-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.

STRAND/TOPIC		Information Technology Career Cluster - Web Development (Course Number: 11.42500)
STANDARD / DESCRIPTION	IT-WDEV-1.	Demonstrate employability skills required by business and industry.
ELEMENT	IT-WDEV-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.

STRAND/TOPIC		Information Technology Career Cluster - Information Technology Essentials (Course Number: 11.41400)
STANDARD / DESCRIPTION	IT-ITE-1.	Demonstrate employability skills required by business and industry.
ELEMENT	IT-ITE-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.

STRAND/TOPIC		Information Technology Career Cluster - Information Technology Support (Course Number: 11.42000)
STANDARD / DESCRIPTION	IT-ITS-1.	Demonstrate employability skills required by business and industry.
ELEMENT	IT-ITS-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.

STRAND/TOPIC		Information Technology Career Cluster - Networking Fundamentals (Course Number: 11.46100)
STANDARD / DESCRIPTION	IT-NF-1.	Demonstrate employability skills required by business and industry.
ELEMENT	IT-NF-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.

STRAND/TOPIC		Information Technology Career Cluster - Networking Systems and Support (Course Number: 11.46200)
STANDARD / DESCRIPTION	IT-NSS-1.	Demonstrate employability skills required by business and industry.
ELEMENT	IT-NSS-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.

STRAND/TOPIC		Information Technology Career Cluster - Web Design (Course Number: 11.45200)
STANDARD / DESCRIPTION	IT-WD-1.	Demonstrate employability skills required by business and industry.
ELEMENT	IT-WD-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.

STRAND/TOPIC		Information Technology Career Cluster - Digital Design (Course Number 11.45100)
STANDARD / DESCRIPTION	IT-DD-1.	Demonstrate employability skills required by business and industry.
ELEMENT	IT-DD-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.

Georgia Standards of Excellence

Technology Education

Grade **12** - Adopted: **2013**

STRAND/TOPIC		Information Technology Career Cluster - Introduction to Digital Technology (Course Number 11.41500)
STANDARD / DESCRIPTION	IT-IDT-1.	Demonstrate employability skills required by business and industry.
ELEMENT	IT-IDT-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.

STRAND/TOPIC		Information Technology Career Cluster - Introduction to Cybersecurity (Course Number: 11.48100)
STANDARD / DESCRIPTION	IT-ICS-1.	Demonstrate employability skills required by business and industry.
ELEMENT	IT-ICS-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.

STRAND/TOPIC		Information Technology Career Cluster - Advanced Cybersecurity (Course Number: 11.48200)
STANDARD / DESCRIPTION	IT-ACS-1.	Demonstrate employability skills required by business and industry.
ELEMENT	IT-ACS-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.

STRAND/TOPIC		Information Technology Career Cluster - Computer Science Principles (Course Number: 11.47100)
STANDARD / DESCRIPTION	IT-CSP-1.	Demonstrate employability skills required by business and industry.
ELEMENT	IT-CSP-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.

STRAND/TOPIC		Information Technology Career Cluster - Computer Science Principles (Course Number: 11.47100)
STANDARD / DESCRIPTION	IT-CSP-5.	Develop, express, implement, and analyze algorithms analytically and empirically.
ELEMENT	IT-CSP-5.1.	Develop an algorithm designed to be implemented to run on a computer.
ELEMENT	IT-CSP-5.2.	Explain the building blocks of algorithms: sequencing, selection, iteration, and recursion.
ELEMENT	IT-CSP-5.3.	Express an algorithm in a language.

ELEMENT	IT-CSP-5.5.	Connect problems to potential algorithmic solutions and explain an example of problems that cannot be solved using algorithms.
STRAND/TOPIC		**Information Technology Career Cluster - Computer Science Principles (Course Number: 11.47100)**
STANDARD / DESCRIPTION	**IT-CSP-6.**	**Create programs that translate human intention into computational artifacts including music, images, visualizations, and more while exploring the concepts, techniques and development used in writing programs.**
ELEMENT	IT-CSP-6.1.	Explain how programs implement algorithms.
STRAND/TOPIC		**Information Technology Career Cluster - Game Design: Animation and Simulation Course Number: 11.42900**
STANDARD / DESCRIPTION	**IT-GDAS-1.**	**Demonstrate employability skills required by business and industry.**
ELEMENT	IT-GDAS-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.
STRAND/TOPIC		**Information Technology Career Cluster - Embedded Computing (Course Number: 11.42700)**
STANDARD / DESCRIPTION	**IT-EP-1.**	**Demonstrate employability skills required by business and industry.**
ELEMENT	IT-EP-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.
STRAND/TOPIC		**Information Technology Career Cluster - Embedded Computing (Course Number: 11.42700)**
STANDARD / DESCRIPTION	**IT-EP-10.**	**Design an embedded computing application that solves a current problem (e.g., robotics, artbotics, visual, and kinetic art).**
ELEMENT	IT-EP-10.1.	Design, develop, and debug an embedded computing application interfacing to an external sensor, switch, LED, or other device.
STRAND/TOPIC		**Information Technology Career Cluster - Programming, Games, Apps, and Society (Course Number: 11.47200)**
STANDARD / DESCRIPTION	**IT-PGAS-1.**	**Demonstrate employability skills required by business and industry.**
ELEMENT	IT-PGAS-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.
STRAND/TOPIC		**Information Technology Career Cluster - Web Development (Course Number: 11.42500)**
STANDARD / DESCRIPTION	**IT-WDEV-1.**	**Demonstrate employability skills required by business and industry.**
ELEMENT	IT-WDEV-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.
STRAND/TOPIC		**Information Technology Career Cluster - Information Technology Essentials (Course Number: 11.41400)**

STANDARD / DESCRIPTION	**IT-ITE-1.**	**Demonstrate employability skills required by business and industry.**
ELEMENT	IT-ITE-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.
STRAND/TOPIC		**Information Technology Career Cluster - Information Technology Support (Course Number: 11.42000)**
STANDARD / DESCRIPTION	**IT-ITS-1.**	**Demonstrate employability skills required by business and industry.**
ELEMENT	IT-ITS-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.
STRAND/TOPIC		**Information Technology Career Cluster - Networking Fundamentals (Course Number: 11.46100)**
STANDARD / DESCRIPTION	**IT-NF-1.**	**Demonstrate employability skills required by business and industry.**
ELEMENT	IT-NF-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.
STRAND/TOPIC		**Information Technology Career Cluster - Networking Systems and Support (Course Number: 11.46200)**
STANDARD / DESCRIPTION	**IT-NSS-1.**	**Demonstrate employability skills required by business and industry.**
ELEMENT	IT-NSS-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.
STRAND/TOPIC		**Information Technology Career Cluster - Web Design (Course Number: 11.45200)**
STANDARD / DESCRIPTION	**IT-WD-1.**	**Demonstrate employability skills required by business and industry.**
ELEMENT	IT-WD-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.
STRAND/TOPIC		**Information Technology Career Cluster - Digital Design (Course Number 11.45100)**
STANDARD / DESCRIPTION	**IT-DD-1.**	**Demonstrate employability skills required by business and industry.**
ELEMENT	IT-DD-1.3.	Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.