

# Iowa Career and Technical Education Middle School Standards



The Strengthening Career and Technical Education for the 21st Century Act (Perkins V) lifted the restriction on spending Perkins funds below grade 7 and allows for support for career exploration in the “middle grades” which includes grades 5 - 8. To address this change that will have a positive impact on Iowa’s career development process, a set of middle school CTE standards was developed. These standards are designed to ensure students gain a full range of desired technical, academic and employability knowledge and skills that are appropriate for middle school CTE programs.

Use these links to go directly to a specific middle school service area:

[Agriculture](#) [Business](#) [FCS](#) [ASTEM](#) [Health](#) [Information Solutions](#)

Link to Iowa K12 21st Century Skills: [Iowa K-12 21<sup>st</sup> Century Skills](#)

## Middle School CTE Common Universal Standards

The Middle School Universal Standards are common to all of the six pathways in Iowa's six CTE service areas and include competencies to help students explore various career options and help students understand what it means to be good employees. This document lists the Iowa Middle School Universal Standards with a crosswalk to Iowa K-12 21st Century Skills followed by service area standards.

Universal CTE Middle School Standards		Universal CTE Standard Crosswalk	21st Century Crosswalk
<b>1. Employability Skills: (overarching comprehensive standard statement)</b>			
1.1	Demonstrate transferable knowledge and skills like attitudes, teamwork, leadership in the learning environment. .	U-1.1	ES.3
1.2	Create an environment that encourages and respects the ideas, perspectives, and contributions of all group members.	U-1.5	ES.2, CL.2
1.3	Evaluate effective conflict prevention techniques.	U-5.3	ES. 1, ES. 2, HL. 2
1.4	Apply the roles of decision making and problem solving in reducing and managing conflict.	U-1.5, U-5.2	ES. 1, ES. 3, HL. 1
1.5	Demonstrate effective responses to bullying harassment.	U-5.3	HL. 4
<b>2. Career Exploration</b>			
2.1	Summarize career pathways within industries; including education needed, training requirements, knowledge, skills, attitudes, and available opportunities.	U-2.1 U-2.4	ES.4
<b>3. Develop Effective Safety Practices</b>			

# Iowa Career and Technical Education Middle School Standards



3.1	Demonstrate safety and sanitation procedures for a clean and safe environment.	U-4.1	HL.5, CL.1
3.2	Students apply safety practices in the learning environment.	U-4.5 U-4.6 U-4.7	HL.3, CL.1
<b>4. Ethics in the Workplace</b>			
4.1	Model ethical behavior and sound decision-making principles in the learning environment.	U-5.2 U-5.3	ES.3
4.2	Examine how the industry contributes to or influences society.	U-5.5	TL.4
<b>5. Leadership &amp; Career and Technical Student Organizations (CTSOs)</b>			
5.1	Demonstrate leadership skills and abilities in school and community settings through participation in civic and community leadership and teamwork opportunities. Exhibit traits such as compassion, service, listening, coaching, developing others, team development, and understanding and appreciating others.	U-1.4	ES. 1, ES. 2, ES.3
5.2	Explore how Iowa's career and technical student organizations (CTSOs) are integral components of career and technical education courses through compounding leadership experiences and professional skill development, service learning opportunities in the school and community and experiential work- and project-based learning and competitive events.	U-1.4	ES.3



## Service Area Middle School CTE Standards

CTE broadly encompasses six service areas: agriculture, food and natural resources; applied sciences, technology, engineering, and manufacturing; business, finance, marketing and management; health science; family and consumer sciences/human services; and information solutions. The Middle School CTE standards that correspond to each service area are required for Iowa schools that offer middle school CTE programs utilizing Perkins funds.

As a suggestion, the Middle School CTE Standards are designed to be offered in various timeframes (6 weeks, 9 weeks, 12 weeks, or 18 weeks). The number of standards covered will be dependent on the timeframe for the course/program.



## Agriculture, Food and Natural Resources Service Area Standards

		Weeks	6	9	12	18
1	Define agricultural products and natural resources consumed by humans. (including food, feed, fuel, fiber, pharmaceuticals, air and water). <b>Tier 1</b>		X			
2	Discuss how human activities impact the production of agricultural products and the effect they have on the health of natural resource.					
3	Debate the influences weather and climate have on the agricultural activities that occur in a region and the effect they have on the availability of agricultural products.					
4	Connect how the physical and biological complexity of soil makes the task of measuring soil health and the task of determining soil uses a challenge.					
5	Evaluate how agricultural STEM achievements contribute solutions to the problems and challenges related to meeting the needs of a growing world population.  (Engineering and Technological Innovations, Food Processing and Safety to make essential nutrients more available while using renewable energy sources and conserving natural resources).					
6	Imagine how agricultural applications can contribute solutions for human/wicked problems. <b>Tier 1</b>		X			
7	Investigate career opportunities for all interest areas that can be explored through agricultural education program participation (ag classes, SAE and FFA). <b>Tier 1</b>		X			

Tier 1 - Prioritize these 3 standards for 6 Week course offerings.

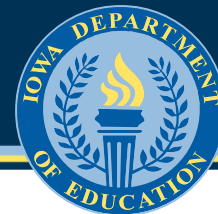
Tier 2 - Add 2 of the 5 remaining standards for 9 Week course offerings.

Tier 3 - Incorporate all standards for 12-18 Week course offerings.



## Applied Science, Technology, Engineering and Manufacturing Service Area Standards

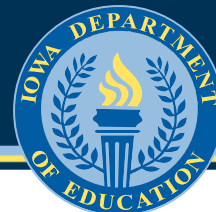
		Weeks	6	9	12	18
<b>1. Practice safety and use tools</b>						
1.1.1	Describe general lab safety rules and procedures.		X	X	X	X
1.1.2	Comply with lab dress standards and use of personal protective equipment (PPE) during lab activities.		X	X	X	X
1.1.3	Identify hand tools/power tools and their appropriate usage.		X	X	X	X
<b>2. Understand measurement systems</b>						
2.1.1	Operate measuring tools to determine various measurement requirements of a prescribed activity.		X	X	X	X
2.1.2	Differentiate and convert between the U.S. customary system and metric system of measurement.		X	X	X	X
<b>3. Understand the engineering design process</b>						
3.1.1	Identify and solve a problem using the engineering design process.			X	X	X
<b>4. Understand power systems</b>						
4.1.1	Identify, build, and troubleshoot basic power systems: electrical, fossil fuel, pneumatic, hydraulic, etc.				X	X
<b>5. Understand energy sources</b>						
5.1.1	Understand nonrenewable energy sources and their effect on the environment.					X
5.1.2	Understand different types of renewable energy sources and their benefits.					X



## Business, Finance, Marketing and Management Service Area Standards

		Weeks	6	9	12	18
<b>1. Understand business concepts and career exploration</b>						
1.1	Identify career pathways in business.		X	X	X	X
1.1.1	Identify the role of various departments within a business, i.e., human resources, management, finance, marketing, IT and operations.		X	X	X	X
1.1.2	Investigate educational requirements, job responsibilities, employment trends and opportunities within the national career clusters using credible sources.		X	X	X	X
1.2	Understand the different types of businesses.		X	X	X	X
1.2.1	Compare business in different industry sectors (manufacturing, retail, service, etc.).		X	X	X	X
1.2.2	Research the day-to-day operations of a small versus large business.		X	X	X	X
<b>2. Understand the role of financial literacy in personal and business decisions</b>						
2.1	Understand financial terms and concepts.				X	X
2.1.1	Explain the purpose and functions of a bank.				X	X
2.1.2	Analyze the different types of bank accounts and determine where it is appropriate to use each one.				X	X
2.1.3	Practice basic record keeping of a bank account, such as writing checks, recordings transactions in a check register and understanding and reconciling a bank statement.				X	X
2.1.4	Differentiate between a credit card, a debit card and a bank card.				X	X
2.1.5	Investigate the economic benefits of good credit and the consequences of debt.				X	X
2.1.6	Examine the different types of credit and determine the appropriate time to use each.				X	X
2.2	Learn to set personal financial goals.				X	X
2.2.1	Develop and analyze a personal finance plan that shows understanding of the personal responsibility of spending choices.				X	X
2.2.2	Identify and explain needs versus wants in creating a financial plan.				X	X
2.2.3	Evaluate the effect of advertising on purchasing decisions.				X	X
2.2.4	Craft a sample balanced personal budget (include needs, wants, savings and charitable giving).				X	X
2.2.5	Determine types of income and expenses and explain how and why it is important to budget and save money.				X	X
2.2.6	Explore and define opportunity costs associated with a purchase and explain what it means to be a smart shopper.				X	X
2.3	Explore the basics of business financial management and the economy.		X	X	X	X
2.3.1	Describe free enterprise (capitalism) and its effect on the economy of a nation.		X	X	X	X
2.3.2	Explain the theory of supply and demand.		X	X	X	X
2.3.3	Investigate the basics of running a business, incorporating simple forms used in recordkeeping (order forms, invoices, sales receipts, packing slips).		X	X	X	X

# Iowa Career and Technical Education Middle School Standards



<b>3. Explore the role of digital technology on business productivity and personal safety</b>					
3.1	Demonstrate effective use of digital tools for production.		X	X	X
3.1.1	Demonstrate knowledge of file management.		X	X	X
3.1.2	Demonstrate knowledge of word processing (basic tasks of software, page layout, formatting text, tables and images).		X	X	X
3.1.3	Demonstrate knowledge of spreadsheets (basic tasks of software, using formulas and functions, inserting columns and charts).		X	X	X
3.1.4	Demonstrate knowledge of presentation programs (slide layouts, animations, transition, formatting text, tables, and images).		X	X	X
3.2	Understand one's role in digital safety and wellness.	X	X	X	X
3.2.1	Define online safety as being aware of online risks and maximizing the user's personal safety.	X	X	X	X
3.2.2	Define intellectual property as a creative work or idea for which an individual has ownership rights.	X	X	X	X
3.3	Recognize the role of digital and social media on business.	X	X	X	X
3.3.1	Identify primary functions and features of digital and social media.	X	X	X	X
3.3.2	Use creativity and digital communications to communicate information for a product.	X	X	X	X
<b>4. Understand how collaboration and communication builds successful projects</b>					
4.1	Understand how collaboration and communication impacts cohesive teams.	X	X	X	X
4.1.1	Practice communicating with others in a variety of ways to explain an idea, solution or problem.	X	X	X	X
4.1.2	Demonstrate conflict resolution skills.	X	X	X	X
4.1.3	Practice active listening skills.	X	X	X	X
4.1.4	Understand the importance of nonverbal communication.	X	X	X	X
4.1.5	Understand the basics of meeting etiquette (preparation and participation, one-on-one versus group meetings, inviting and introducing speakers, preparing visual aids, agendas and minutes).	X	X	X	X
4.2	Apply the elements of successful project management.			X	X
4.2.1	Plan and/or participate in a community service project.			X	X
4.2.2	Demonstrate critical thinking and problem-solving skills.			X	X
4.2.3	Demonstrate creativity by asking challenging questions and applying innovative procedures and methods.			X	X
4.2.4	Model work readiness traits required for success in the workplace including integrity, honesty, accountability, punctuality, time management and respect for diversity.			X	X
<b>5. Understand how marketing and innovation impact entrepreneurial ideas and decisions</b>					
5.1	Demonstrate entrepreneurial innovation.	X	X	X	X
5.1.1	Develop an idea for a product or service based on a need.	X	X	X	X
5.1.2	Explain how to produce the product.		X	X	X
5.1.3	Determine the price of a product.		X	X	X
5.1.4	Evaluate the quality of a product or service.		X	X	X
5.2	Define essential marketing concepts in product development.	X	X	X	X

# Iowa Career and Technical Education Middle School Standards



5.2.1	Determine how the product or service will be delivered to the customer.		X	X	X
5.2.2	Describe product support best practices.		X	X	X
5.2.3	Define the four Ps of marketing (product, price, place, promotion).	X	X	X	X
5.2.4	Apply ethics to demonstrate trustworthiness.		X	X	X





## Health Science Service Area Standards

		Weeks	6	9	12	18
<b>1. Academic foundation: Health care professionals will know the academic subject matter required for proficiency within their area. They will use this knowledge as needed in their role. The following accountability criteria are considered essential for students in a health science program of study</b>						
1.1	Human structure and function					
1.1.1	Classify the basic structural and functional organization of the human body (tissue, organ, and system).	X	X	X	X	
1.1.3	Analyze the basic structure and function of the human body.	X	X	X	X	
1.1.4	Demonstrate anatomical position.	X	X	X	X	
1.3	Medical mathematics					
1.3.3	Record time using the 24-hour clock.	X	X	X	X	
<b>2. Communications: Health care professionals will know the various methods of giving and obtaining information. They will communicate effectively, both orally and in writing</b>						
2.1	Concepts of effective communication					
2.1.1	Interpret verbal and nonverbal communication.	X	X	X	X	
2.1.5	Apply speaking and active listening skills.	X	X	X	X	
2.3	Written communication skills					
2.3.1	Recognize elements of written and electronic communication (spelling, grammar and formatting).	X	X	X	X	
2.3.2	Demonstrate appropriate use of digital communication in a work environment, such as email, text and social media.	X	X	X	X	
<b>4. Employability skills: Health care professionals will understand how employability skills enhance their employment opportunities and job satisfaction. They will demonstrate key employability skills and will maintain and upgrade skills, as needed</b>						
4.1	Personal traits of the health care professional					
4.1.2	Summarize professional standards as they apply to hygiene, dress, language, confidentiality (Health Insurance Portability and Accountability Act -HIPAA) and behavior.	X	X	X	X	
4.3	Career decision-making					
4.3.2	Compare careers within the health science career pathways (diagnostic services, therapeutic services, health informatics, support services, or biotechnology research and development).	X	X	X	X	
<b>6. Ethics: Health care professionals will understand accepted ethical practices with respect to cultural, social and ethnic differences within the health care environment. They will perform quality health care delivery</b>						
6.2	Ethical practice					
6.2.2	Apply principles of ethical behavior to health care situations.	X	X	X	X	
6.3	Cultural, social and ethnic diversity					
6.3.1	Understand religious and cultural values as they impact health care.	X	X	X	X	
<b>7. Safety practices: Health care professionals will understand the existing and potential hazards to clients, coworkers and self. They will</b>						

# Iowa Career and Technical Education Middle School Standards



<b>prevent injury or illness through safe work practices and follow health and safety policies and procedures</b>					
7.1	Infection control				
7.1.1	Explain principles of infection control.	X	X	X	X
7.2	Personal safety				
7.2.3	Demonstrate and apply the use of personal protective equipment (PPE).	X	X	X	X
<b>8. Teamwork: Health care professionals will understand the roles and responsibilities of individual members as part of the healthcare team, including their ability to promote the delivery of quality healthcare. They will interact effectively and sensitively with all members of the health care team</b>					
8.1	Health care teams				
8.1.2	Identify characteristics of effective teams and team members in various roles.	X	X	X	X
8.2	Team member participation				
8.2.2	Analyze attributes and attitudes of effective team leaders and team members.	X	X	X	X
<b>9. Health maintenance practices: Health care professionals will understand the fundamentals of wellness and the prevention of disease processes. They will practice preventive health behaviors among the clients</b>					
9.1	Healthy behaviors				
9.1.1	Apply behaviors that promote health and wellness.	X	X	X	X
<b>10. Technical skills: Health care professionals will apply technical skills required for all career specialties. They will demonstrate skills and knowledge as appropriate</b>					
10.1	Technical skills				
10.1.2	Apply skills to obtain training or certification in cardiopulmonary resuscitation (CPR), automated external defibrillator (AED), foreign body airway obstruction (FBAO) and First Aid.	X	X	X	X
<b>11. Information technology applications: Health care professionals will use information technology applications required within all career specialties. They will demonstrate use as appropriate to health care applications</b>					
11.3	Basic computer literacy skills				
11.3.5	Evaluate the validity of web-based resources.	X	X	X	X
11.3.6	Demonstrate use of appropriate email and social media usage.	X	X	X	X



## Family and Consumer Sciences Service Area Standards

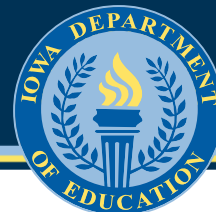
		Weeks	6	9	12	18
<b>1. Career and community connections</b>						
1.0	Integrate multiple life roles and responsibilities in family, work and community settings.		X	X	X	X
1.1	Analyze strategies to manage multiple roles and responsibilities (individual, family, career, community and global).		X	X	X	X
1.1.4	Analyze potential effects of various career path decisions on balancing work and family.		X	X	X	X
1.1.6	Develop a life plan, including pathways to acquiring the knowledge and skills needed to achieve individual, family and career goals.			X	X	X
<b>2. Financial literacy</b>						
2.0	Evaluate management practices related to the human, economic and environmental resources in a global context.		X	X	X	X
2.1	Demonstrate management of individual and family resources such as food, clothing, shelter, health care, recreation, transportation, time and human capital.		X	X	X	X
2.1.1	Apply time management, organizational and process skills to prioritize tasks and achieve goals.		X	X	X	X
2.1.2	Analyze how individuals and families make choices to satisfy needs and wants.		X	X	X	X
2.6	Demonstrate management of financial resources to meet the goals of individuals and families across the lifespan.		X	X	X	X
2.6.1	Evaluate the need for personal and family financial planning.		X	X	X	X
2.6.2	Apply financial management principles to individual and family financial practices.			X	X	X
<b>6. Family</b>						
6.0	Evaluate the significance of family and its effects on the well-being of individuals and society.		X	X	X	X
6.1	Analyze the effects of family as a system on individuals and society.		X	X	X	X
6.1.1	Analyze family as the basic unit of society.		X	X	X	X
6.1.2	Analyze the role of family in transmitting societal expectations.		X	X	X	X
6.2	Evaluate the effects of diverse perspectives, needs and characteristics of individual families.		X	X	X	X
6.2.1	Demonstrate awareness of multiple diversities and their effects on individuals, families and society.		X	X	X	X
6.2.2	Analyze the effects of social and cultural diversity on individuals and families.					X
<b>7. Family and human services</b>						
7.4	Analyze the impact of conditions that could influence the well-being of individuals and families.		X	X	X	X
7.4.1	Investigate health, wellness and safety issues of individuals and families with a variety of conditions that could influence their well-being.		X	X	X	X
7.4.4	Differentiate between situations that require personal prevention or intervention and those situations that require professional assistance.		X	X	X	X

# Iowa Career and Technical Education Middle School Standards



7.5.4	Summarize the importance of friends, family and community relationships for individuals with a variety of conditions that affect their well-being.	X	X	X	X
<b>8. Food preparation</b>					
8.0	Integrate knowledge, skills and practices required for careers in food production and services.	X	X	X	X
8.2	Demonstrate food safety and sanitation procedures.	X	X	X	X
8.2.5	Practice standard personal hygiene and wellness procedures.	X	X	X	X
8.2.8	Analyze current types of cleaning and sanitizing materials for proper use.	X	X	X	X
8.5	Demonstrate professional food preparation methods and techniques for all menu categories to produce a variety of food products that meet customer needs.	X	X	X	X
8.5.1	Demonstrate professional skills in safe handling of knives, tools and equipment.	X	X	X	X
8.5.2	Demonstrate professional skill for a variety of cooking methods including roasting, broiling, smoking, grilling, sautéing, pan frying, deep frying, braising, stewing, poaching, steaming and baking using professional equipment and current technologies.		X	X	X
<b>11. Housing and interior design</b>					
11.2	Evaluate housing and design concepts and theories, including sustainability and universal design, in relation to available resources and options.		X	X	X
11.2.1	Evaluate the use of elements and principles of design in housing and commercial and residential interiors.		X	X	X
11.2.2	Analyze the psychological impact that the principles and elements of design have on the individual.		X	X	X
<b>12. Human/child development</b>					
12.0	Analyze factors that influence human growth and development.	X	X	X	X
12.1	Analyze principles of human growth and development across the life span.	X	X	X	X
12.1.1	Analyze physical, emotional, social, moral and cognitive development.	X	X	X	X
12.1.2	Analyze interrelationships among physical, emotional, social, moral and cognitive aspects of human growth and development.	X	X	X	X
12.2	Analyze conditions that influence human growth and development.	X	X	X	X
12.2.1	Analyze the influences of heredity and environment on human growth and development.	X	X	X	X
12.2.2	Analyze the influences of social, economic and technological forces on individual growth and development.	X	X	X	X
12.2.4	Analyze the influences of life events on individuals' physical, emotional, social, moral and cognitive development.	X	X	X	X
12.3	Analyze strategies that promote growth and development across the life span.	X	X	X	X
12.3.1	Analyze the role of nurturance on human growth and development.	X	X	X	X
12.3.2	Analyze the role of communication on human growth and development.	X	X	X	X
<b>13. Social and emotional learning</b>					

# Iowa Career and Technical Education Middle School Standards



13.0	Demonstrate respectful and caring relationships in the family, workplace and community.	X	X	X	X
13.1	Analyze functions and expectations of various types of relationships.	X	X	X	X
13.1.1	Analyze processes for building and maintaining interpersonal relationships.	X	X	X	X
13.1.4	Analyze factors that contribute to healthy and unhealthy relationships.	X	X	X	X
13.1.6	Demonstrate stress management strategies for family, work and community settings.	X	X	X	X
13.2	Analyze personal needs and characteristics and their effects on interpersonal relationships.	X	X	X	X
13.2.1	Analyze the effects of personal characteristics on relationships.	X	X	X	X
13.2.3	Analyze the effects of self-esteem and self-image on relationships.	X	X	X	X
<b>14. Nutrition and wellness</b>					
14.0	Demonstrate nutrition and wellness practices that enhance individual and family well-being.	X	X	X	X
14.2	Examine the nutritional needs of individuals and families in relation to health and wellness across the life span.	X	X	X	X
14.2.1	Evaluate the effect of nutrition on health, wellness and performance.		X	X	X
14.2.3	Analyze the effects of food and diet fads, food addictions and eating disorders on wellness.	X	X	X	X
14.2.4	Analyze sources of food and nutrition information, including food labels, related to health and wellness.	X	X	X	X
14.3	Demonstrate ability to acquire, handle and use foods to meet nutrition and wellness needs of individuals and families across the life span.	X	X	X	X
14.3.1	Apply current dietary guidelines in planning to meet nutrition and wellness needs.	X	X	X	X
14.3.3	Demonstrate ability to select, store, prepare and serve nutritious, aesthetically pleasing food and food products.	X	X	X	X
14.4	Evaluate factors that affect food safety from production through consumption.	X	X	X	X
14.4.1	Analyze conditions and practices that promote safe food handling.	X	X	X	X
14.4.5	Analyze foodborne illness factors, including causes, potentially hazardous foods and methods of prevention.	X	X	X	X
<b>16. Textiles, fashion and apparel</b>					
16.4	Demonstrate skills needed to produce, alter or repair textiles, fashion and apparel.		X	X	X
16.4.4	Analyze current technology, trends and innovations that facilitate design and production of textiles, fashion and apparel.		X	X	X
16.4.5	Demonstrate basic skills for production, alteration, repair and recycling of textiles, fashion and apparel.		X	X	X



## Information Solutions Service Area Standards

		Weeks	6	9	12	18
<b>1. Understand ethics and safety when using technology</b>						
1.1	Explore and recognize the rights, responsibilities and opportunities of living, learning and working in a digital landscape.		X	X	X	X
1.1.1	Compare differences between ethical and unethical online and digital use behavior.		X	X	X	X
1.1.2	Identify the consequences of unethical uses of technology.		X	X	X	X
1.1.3	Explain how digital actions are never fully erasable.		X	X	X	X
1.2	Demonstrate and advocate for positive, safe, legal and ethical habits when using technology.		X	X	X	X
1.2.1	Recognize and manage digital identities.		X	X	X	X
1.2.2	Lead discussion about media literacy and online safety.		X	X	X	X
1.2.3	Explain the positive and negative impact the use of technology can have on personal, professional and community relationships.		X	X	X	X
1.3	Demonstrate an understanding of intellectual property.			X	X	X
1.3.1	Correctly utilize and cite copyrighted works in digital tasks.			X	X	X
1.3.2	Identify basics of copyright, permission and fair use.			X	X	X
1.4	Demonstrate an understanding of personal data and how to keep it private and secure.		X	X	X	X
1.4.1	Discuss when to share personal information.		X	X	X	X
1.4.2	Identify strategies for creating and protecting passwords.		X	X	X	X
1.4.3	Identify terminology such as encryption, HTTPS, cookies and computer viruses.			X	X	X
1.4.4	Evaluate digital tools to determine safety, privacy policy and appropriate usage.				X	X
1.4.5	Explore limitations of data management and data-collection technologies.					X
<b>2. Understand different technology devices and the support they provide to produce a product</b>						
2.1	Demonstrate management of individual and family resources such as food, clothing, shelter, health care, recreation, transportation, time and human capital.		X	X	X	X
2.1.1	Apply time management, organizational and process skills to prioritize tasks and achieve goals.		X	X	X	X
2.1.2	Analyze how individuals and families make choices to satisfy needs and wants.		X	X	X	X
2.1.3	Compare and contrast the functions, features and limitations of similar technologies.		X	X	X	X
2.2	Define basic terminology associated to various devices.				X	X
2.2.1	Research current and emerging technologies.				X	X
2.2.2	Describe how people from different disciplines combined their skills in the design and production of new technologies.				X	X
2.2.3	Analyze potential impacts on personal, community and work settings.				X	X

# Iowa Career and Technical Education Middle School Standards



2.3	Utilize a variety of devices to support planning, implementing and reflecting upon a defined task.		X	X	X
2.3.1	Develop criteria for selecting digital tools and resources to accomplish a defined task.		X	X	X
2.3.2	Apply knowledge and skills from existing technologies and devices to successfully use new technologies.		X	X	X
2.4	Use logic to solve problems to demonstrate trouble-shooting skills when encountering technology issues.	X	X	X	X
2.4.1	Identify successful troubleshooting strategies for minor hardware and software issues and problems.	X	X	X	X
<b>3. Use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions</b>					
3.1	Analyze and select digital tools to support a design process.	X	X	X	X
3.1.1	Identify stages of the design process and appropriately match digital tools to each stage.		X	X	X
3.1.2	Demonstrate skill with design tools to develop and/or revise a model.		X	X	X
3.2	Explore design processes and employ to generate ideas, create innovative products or solve authentic problems.			X	X
3.2.1	Investigate and illustrate complex ideas or processes using a digital tool to develop thinking.			X	X
3.2.2	Utilize digital tools to brainstorm and develop collaborative solutions to a shared problem.			X	X
3.3	Develop, test and revise prototypes utilizing a cyclical process of trial and error and reflecting on problems or setbacks as opportunities for improvement.			X	X
3.3.1	Utilize criteria developed with guidance to evaluate a product.			X	X
3.3.2	Create design prototypes to address a defined task or challenge.			X	X
3.3.3	Demonstrate understanding of collecting and using data to refine models.			X	X
<b>4. Develop algorithmic thinking and introductory programming procedures</b>					
4.1	Design and illustrate algorithms to solve problems.	X	X	X	X
4.1.1	Utilize pseudocode to decompose or design algorithms and illustrate flow of execution.	X	X	X	X
4.1.2	Construct solutions to problems using components such as procedures, modules and or objects.	X	X	X	X
4.2	Demonstrate written communication skills through documentation and annotation.		X	X	X
4.2.1	Create naming conventions for variables and functions that support the design and problem-solving process.		X	X	X
4.2.2	Annotate works by adding descriptors and comments for future use and communication.		X	X	X
4.3	Design and iteratively develop programs that combine control structures.	X	X	X	X
4.3.1	Define and explore common control structures.	X	X	X	X
4.3.2	Identify appropriate applications for control structures.		X	X	X

# Iowa Career and Technical Education Middle School Standards



4.3.3	Develop simple programs using control structures such as loops or conditional logic statements.		X	X	X
4.3.4	Create procedures with or without parameters.		X	X	X
4.3.5	Design software that guides system input and output.		X	X	X
4.4	Demonstrate understanding of program reuse and application.			X	X
4.4.1	Write original programs that incorporate someone else's code and/or media and give proper attribution.			X	X
4.4.2	Identify and responsibly repurpose existing resources to creatively solve new problems.			X	X
<b>5. Understand communication concepts and strategies to interact and collaborate with others</b>					
5.1	Demonstrate the ability to work as a team member.	X	X	X	X
5.1.1	Define conflict resolution strategies in a team setting.	X	X	X	X
5.1.2	Understand cultural differences in communication.	X	X	X	X
5.2	Demonstrate ability to communicate ideas clearly using various digital tools.	X	X	X	X
5.2.1	Integrate multimedia and visual displays into presentations to clarify information and strengthen claims and evidence.	X	X	X	X
5.3	Apply the elements of successful project management.			X	X
5.3.1	Demonstrate ability to develop and manage a project to completion.			X	X