Texas CTE

Career Development and Career and Technical Education (2017): Grades 9, 10, 11, 12

Adopted 2017

Project-Based Research

1. **The student applies mathematics, science, English language arts, and social studies in an independent study. The student is expected to:** PB.1
   - A. select an original independent study project for personal enrichment and career development; PB.1.A
   - B. use reading and research skills to investigate self-selected topics and compile a research portfolio; PB.1.B
   - C. collaborate with an interdisciplinary team to develop a project; PB.1.C
   - D. identify community, state, national, or international issues to select a project; PB.1.D
   - E. conduct a project under the supervision of a mentor; PB.1.E
   - F. use scientific methods of investigation; PB.1.F
   - G. apply statistical concepts to analyze data, evaluate results, and draw conclusions; PB.1.G
   - H. compare and contrast findings in a coherent and organized manner; and PB.1.H
   - I. present the independent research project to an appropriate audience of experts in the field using a variety of technologies. PB.1.I
2. **The student uses verbal and nonverbal communication skills. The student is expected to:** PB.2
   - A. listen actively and effectively in group discussions; PB.2.A
   - B. use a variety of resources to access, process, and collect data relevant to the project; and PB.2.B
   - C. document the time and cost to accomplish the project goal. PB.2.C
3. **The student demonstrates professional ethical behavior standards and legal responsibilities. The student is expected to:** PB.3

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A. analyze ethical challenges determined by factors such as cost, new and emerging technologies, and allocation of limited resources; and PB.3.A

B. review legal issues related to the research project. PB.3.B

4. **The student designs and develops a research project related to their career interests. The student is expected to:** PB.4

A. identify processes to be used in the independent research project; and PB.4.A

B. use resources to complete a project. PB.4.B

5. **The student uses technology needed to complete a research project. The student is expected to:** PB.5

A. use search engines, databases, and other digital electronic tools effectively to locate information; PB.5.A

B. evaluate quality, accuracy, completeness, reliability, and currency of information from any source; PB.5.B

C. prepare, organize, and present independent research and mentor experiences; PB.5.C

D. receive constructive criticism and revise personal views when valid evidence warrants; and PB.5.D

E. prepare and present research information in appropriate formats to a panel of experts in the field. PB.5.E

6. **The student evaluates the research project. The student is expected to:** PB.6

A. create weekly progress reports that address time management and goal setting; PB.6.A

Applied Mathematics for Technical Professionals

1. **The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:** AM.1

A. apply mathematics to problems arising in everyday life, society, and the workplace; AM.1.A

B. use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution; AM.1.B

C. select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems; AM.1.C

D. communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate; AM.1.D

E. create and use representations to organize, record, and communicate mathematical ideas; AM.1.E

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F. analyze mathematical relationships to connect and communicate mathematical ideas; and AM.1.F

G. display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication. AM.1.G

2. **The student uses mathematical concepts of algebra to explain linear and non-linear applications in business and industry situations. The student is expected to:** AM.2

A. calculate rise and run such as the rise and run of stair stringers or roof pitch; AM.2.A

B. distinguish the purpose and difference of a linear and non-linear increase and decrease of a variable with time such as cost or profit; AM.2.B

C. write systems of equations and inequalities from real-life situations that compare "best deal opportunities" with profit and expenses in businesses; AM.2.C

D. use linear programing to maximize or minimize linear objective function in real-life situations and determine the reasonableness of solutions; AM.2.D

E. express numbers as powers of 10 in business and industry settings; AM.2.E

F. determine the powers and roots of numbers; AM.2.F

G. apply compound interest formulas related to operating a business; and AM.2.G

H. use exponential decay models to determine the depreciation on equipment used in business and industry and explain the meaning of models. AM.2.H

3. **The student applies geometric concepts to real-world problems in technical situations. The student is expected to:** AM.3

A. identify various geometric figures in order to identify what formulas are needed to solve situational problems; AM.3.A

B. compute measurements such as area, surface area, volume, perimeter, and circumference in order to prepare engineering drawings for projects; AM.3.B

C. use trigonometric functions such as sine, cosine, tangent, cotangent, cosecant, and secant to calculate angles and length of sides; AM.3.C

D. apply Heron's formula for finding areas of triangles when the height is not known; AM.3.D

E. determine how changing dimensions will affect the perimeter, area, surface area, or volume in a project; AM.3.E

F. determine how angles will affect structural strength and stability; AM.3.F

G. apply right triangle relationships using the Pythagorean Theorem, special right triangles, and trigonometry for roof construction, building the frame of a car, or calculating machined parts; AM.3.G

H. determine the materials needed for a job or project by finding missing parts of a circle; AM.3.H

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I. draw orthographic and isometric views and use them to produce engineering drawings; AM.3.I

J. use cross-sections, including conic sections, of three-dimensional figures to relate to plane figures in specific detail on an engineered drawing; and AM.3.J

K. explain and use auxiliary views, revolutions, intersections, and engineered drawings. AM.3.K

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4. The student applies measurement to all aspects of business and industry occupations. The student is expected to: AM.4

A. use dimensional analysis to select an appropriate tool to make measurements; AM.4.A

B. apply accurate readings of both U.S. customary and metric measuring devices to a problem situation; AM.4.B

C. square, measure, and cut materials to specified dimensions; AM.4.C

D. draw segments to scale using an accurate scale and measure segments that are drawn to scales; AM.4.D

E. convert temperature values between Celsius and Fahrenheit in situations involving thermodynamics; and AM.4.E

F. determine length, distance, area, surface area, volume, and weight with appropriate unit labels. AM.4.F

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5. The student uses mathematical processes with graphical and numerical techniques to study patterns and analyze data related to finance. The student is expected to: AM.5

A. use rates and linear functions to solve problems involving finance and budgeting, including compensations and deductions; AM.5.A

B. solve problems related to local, state, and federal taxes; AM.5.B

C. analyze data to make decisions about banking and finance; AM.5.C

D. use mathematical processes with algebraic formulas, numerical techniques, and graphs to solve problems related to job cost analysis; AM.5.D

E. identify what parameters to change such as cost of materials, cost of labor, and work time required to improve the overall cost of a project; and AM.5.E

F. identify the most reasonable mathematical solution using estimation. AM.5.F

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6. The student applies mathematical processes to design a study and use graphical, numerical, and analytical techniques to communicate the results. The student is expected to: AM.6

A. interpret and present situations in terms of given graphs and that fit graphics; AM.6.A

B. apply Ohm's Law and Kirchhoff's laws to troubleshoot electrical circuits; AM.6.B

C. collect and organize data; make and interpret scatterplots; and model, predict, and make decisions and critical judgments; and AM.6.C

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D. prepare technical reports and presentations with visual media or models, including tables, graphs, and verbal descriptions. AM.6.D

7. **The student applies mathematical principles of manufacturing processes. The student is expected to:** AM.7

   A. identify the line types used on engineering drawings; AM.7.A

   B. identify selected symbols commonly used on engineering drawings; AM.7.B

   C. identify the components of engineering drawings; AM.7.C

   D. read, interpret, and create engineering drawings; and AM.7.D

   E. use proper nomenclature when identifying engineering or manufacturing processes. AM.7.E

Career Preparation I

1. **The student demonstrates professional employability skills to gain an entry-level position. The student is expected to:** CP1.1

   A. identify employment opportunities; CP1.1.A

   B. demonstrate the application of essential workplace knowledge and skills; CP1.1.B

   C. develop a resume; CP1.1.C

   D. demonstrate proper interview techniques in various situations; and CP1.1.D

   E. create and complete appropriate documents such as electronic portfolio, employment application, letter of intent, I-9 form, W-4 form, and thank you letters. CP1.1.E

2. **The student develops skills for success in the workplace. The student is expected to:** CP1.2

   A. identify and model appropriate grooming and appearance for the workplace; CP1.2.A

   B. demonstrate dependability, punctuality, and initiative; CP1.2.B

   C. research positive interpersonal skills, including respect for diversity; CP1.2.C

   D. model appropriate business and personal etiquette in the workplace; CP1.2.D

   E. exhibit productive work habits, ethical practices, and a positive attitude; CP1.2.E

   F. demonstrate the ability to work with other employees to support the organization and complete assigned tasks; CP1.2.F

   G. identify how to prioritize work to fulfill responsibilities and meet deadlines; CP1.2.G

   H. evaluate the relationship of good physical and mental health to job success and personal achievement; CP1.2.H

   I. demonstrate effective methods to secure, maintain, and terminate employment; and CP1.2.I

   J. develop soft skills in a working environment. CP1.2.J

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The student discusses work ethics, employer expectations, interactions with diverse populations, and communication skills in the workplace. The student is expected to: CP1.3

A. illustrate how personal integrity affects human relations on the job; CP1.3.A

B. research characteristics of successful working relationships such as teamwork, conflict resolution, self-control, and ability to accept criticism; CP1.3.B

C. discuss and analyze employer expectations; CP1.3.C

D. demonstrate respect for the rights of others; CP1.3.D

E. develop listening skills; CP1.3.E

F. apply effective listening skills used in the workplace; CP1.3.F

G. identify ethical standards; and CP1.3.G

H. comply with organizational policies and procedures. CP1.3.H

4. **The student applies academic skills to the workplace. The student is expected to:** CP1.4

A. apply mathematical skills to business transactions; CP1.4.A

B. develop a personal budget based on a career choice; CP1.4.B

C. interpret data from tables, charts, and graphs to estimate and find solutions to problems; and CP1.4.C

D. organize, write, and compile workplace business documents. CP1.4.D

5. **The student applies the ethical code of conduct and legal responsibilities within the workplace. The student is expected to:** CP1.5

A. research and compare published workplace policies and procedures; CP1.5.A

B. demonstrate responsible and ethical behavior; CP1.5.B

C. summarize provisions of the Fair Labor Standards Act; CP1.5.C

D. describe the consequences of "breach of confidentiality"; and CP1.5.D

E. research and describe laws related to different careers. CP1.5.E

6. **The student applies the use of self-development techniques and interpersonal skills. The student is expected to:** CP1.6

A. identify and practice effective interpersonal and team-building skills with coworkers, managers, and customers; and CP1.6.A

B. develop effective leadership skills through participation in activities such as career and technical student organizations. CP1.6.B

7. **The student applies concepts and skills related to safety in the workplace. The student is expected to:** CP1.7

A. identify and apply safe working practices related to the workplace; CP1.7.A

B. demonstrate knowledge of personal and occupational safety practices in the workplace; CP1.7.B

C. offer solutions related to unsafe work practices and attitudes; CP1.7.C

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D. explain Occupational Safety and Health Administration regulations in the workplace; and CP1.7.D

E. determine health and wellness practices that influence job performance. CP1.7.E

8. The student evaluates personal attitudes and work habits that support career retention and advancement. The student is expected to: CP1.8

A. analyze the future employment outlook in the occupational area; CP1.8.A

B. describe entrepreneurial opportunities in the occupational area; CP1.8.B

C. compare rewards and demands for various levels of employment in a variety of careers; CP1.8.C

D. evaluate strategies for career retention and advancement in response to the changing global workplace; CP1.8.D

E. summarize the rights and responsibilities of employers and employees; and CP1.8.E

F. determine effective money-management and financial-planning techniques. CP1.8.F

9. The student identifies skills and attributes necessary for professional advancement. The student is expected to: CP1.9

A. evaluate and compare employment options, including salaries and benefits; CP1.9.A

B. determine how interests, abilities, personal priorities, and family responsibilities affect career choices; and CP1.9.B

C. determine continuing education opportunities that enhance career advancement and promote lifelong learning. CP1.9.C

Career Preparation II

1. The student uses and evaluates employability skills to improve marketability within the workplace. The student is expected to: CP2.1

A. refine a professional electronic portfolio such as a two- to four-year individual career plan of study, resume, cover letter, awards, commendations, and thank you letters; CP2.1.A

B. obtain letters of recommendation; CP2.1.B

C. expand personal communication skills; and CP2.1.C

D. refine interview skills. CP2.1.D

2. The student demonstrates professional employability skills as required by business and industry. The student is expected to: CP2.2

A. maintain appropriate grooming and appearance for the workplace; CP2.2.A

B. demonstrate positive interpersonal skills, including respect for diversity; CP2.2.B

C. demonstrate appropriate business and personal etiquette in the workplace; CP2.2.C

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D. exhibit productive work habits, attitudes, and ethical practices; CP2.2.D

E. evaluate consequences for breach of personal and occupational safety practices in the workplace; and CP2.2.E

F. prioritize work to fulfill responsibilities and meet deadlines. CP2.2.F

3. **The student applies work ethics, job expectations, multicultural considerations, and communication skills in the workplace. The student is expected to:** CP2.3

A. evaluate personal integrity and its effects on human relations in the workplace; CP2.3.A

B. evaluate characteristics of successful working relationships such as teamwork, conflict resolution, self-control, and the ability to accept criticism; CP2.3.B

C. recognize and appreciate diversity in the workplace; CP2.3.C

D. analyze employer expectations; CP2.3.D

E. exhibit productive work habits and attitudes; CP2.3.E

F. communicate effectively to a variety of audiences; CP2.3.F

G. analyze ethical standards; and CP2.3.G

H. comply with organizational policies and procedures. CP2.3.H

4. **The student applies and enhances academic knowledge and skills in the workplace. The student is expected to:** CP2.4

A. apply critical- and creative-thinking skills to solve complex problems; CP2.4.A

B. integrate mathematical concepts into business transactions; CP2.4.B

C. analyze and apply data from tables, charts, and graphs to find solutions to problems; CP2.4.C

D. apply effective listening skills used in the workplace; CP2.4.D

E. read and write technical reports and summaries; and CP2.4.E

F. apply effective verbal, nonverbal, written, and electronic communication skills. CP2.4.F

5. **The student recognizes legal responsibilities of the workplace. The student is expected to:** CP2.5

A. evaluate provisions of the Fair Labor Standards Act; CP2.5.A

B. analyze the legal consequences of "breach of confidentiality"; and CP2.5.B

C. research and describe laws governing the different professions. CP2.5.C

6. **The student recognizes the dangers of identity theft. The student is expected to:** CP2.6

A. identify various methods criminals use to obtain information; and CP2.6.A

B. research how to avoid becoming a victim. CP2.6.B

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7. **The student applies the use of interpersonal skills to improve personal development. The student is expected to:** CP2.7
   - A. evaluate effective interpersonal and team-building skills involving situations with coworkers, managers, and customers; and CP2.7.A
   - B. participate in leadership and career-development activities. CP2.7.B
8. **The student recognizes knowledge and skills related to safety in the workplace. The student is expected to:** CP2.8
   - A. apply safe working practices to a training station; CP2.8.A
   - B. evaluate unsafe work practices and attitudes; CP2.8.B
   - C. evaluate the impact of Occupational Safety and Health Administration regulations in the workplace; CP2.8.C
   - D. recognize the importance of applying safety rules in all situations; and CP2.8.D
   - E. analyze health and wellness practices that influence job performance. CP2.8.E
9. **The student acquires the academic and technical skills for future education and employment in high-skill, high-wage, or high-demand occupations. The student is expected to:** CP2.9
   - A. research and identify current or emerging occupations; CP2.9.A
   - B. analyze future employment outlook; CP2.9.B
   - C. research entrepreneurial opportunities; CP2.9.C
   - D. analyze rewards and demands for various levels of employment; CP2.9.D
   - E. identify the academic and technical entry requirements for employment in various high-skill, high-wage, or high-demand occupations; CP2.9.E
   - F. identify and pursue opportunities available in high school and postsecondary to acquire the necessary academic and technical skills for employment in high-skill, high-wage, or high-demand occupations; CP2.9.F
   - G. evaluate the rights and responsibilities of employers and employees; and CP2.9.G
   - H. apply money-management and financial-planning techniques. CP2.9.H
10. **The student identifies skills and characteristics necessary for professional advancement. The student is expected to:** CP2.10
    - A. evaluate and compare employment advancement options such as salaries, benefits, and prerequisites; CP2.10.A
    - B. compare rewards and demands for various levels of employment in a variety of careers; CP2.10.B
    - C. determine continuing education opportunities that enhance career advancement and promote lifelong learning; CP2.10.C
    - D. determine preparation requirements for levels of employment in a variety of careers; CP2.10.D

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E. determine personal priorities such as interests, abilities, and family responsibilities affecting career choice; and CP2.10.E

F. demonstrate effective methods to secure, maintain, and terminate employment. CP2.10.F

Extended Career Preparation

1. **The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:** EC.1

   A. participate in a paid work-based application of previously studied knowledge and skills related to career and technical education; EC.1.A

   B. participate in training, education, or preparation for licensure, certification, or other relevant credentials to prepare for employment; EC.1.B

   C. demonstrate professional standards and personal qualities needed to be employable such as punctuality, initiative, and cooperation with increased fluency; EC.1.C

   D. complete tasks with high standards to ensure delivery of quality products and services; EC.1.D

   E. employ teamwork and conflict-management skills with increased fluency to achieve collective goals; and EC.1.E

   F. employ planning and time-management skills with increased fluency to enhance results and complete work tasks. EC.1.F

2. **The student implements advanced professional communications strategies. The student is expected to:** EC.2

   A. apply appropriate content knowledge, technical concepts, and vocabulary with increased fluency when analyzing information and following directions; EC.2.A

   B. demonstrate verbal and non-verbal communication consistently in a clear, concise, and effective manner; EC.2.B

   C. analyze, interpret, and effectively communicate information, data, and observations; EC.2.C

   D. observe and interpret verbal and nonverbal cues and behaviors to enhance communication; EC.2.D

   E. apply active listening skills to obtain and clarify information; and EC.2.E

   F. employ effective internal and external communications to support work activities. EC.2.F

3. **The student applies concepts of critical thinking and problem solving. The student is expected to:** EC.3

   A. employ critical-thinking skills with increased fluency both independently and in groups to solve problems and make decisions; EC.3.A

   B. analyze elements of a problem to develop creative and innovative solutions; and EC.3.B

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C. demonstrate the use of content, technical concepts, and vocabulary when analyzing information and following directions. EC.3.C

4. **The student understands and applies proper safety techniques in the workplace. The student is expected to:** EC.4

   A. demonstrate an understanding of and consistently follow workplace safety rules and regulations; EC.4.A

   B. demonstrate safe operation of tools and equipment used in the industry; EC.4.B

   C. describe and perform hazard analysis; and EC.4.C

   D. demonstrate knowledge of procedures for reporting and handling accidents and safety incidents. EC.4.D

5. **The student understands the professional, ethical, and legal responsibilities as they relate to employment and the workplace. The student is expected to:** EC.5

   A. demonstrate a positive, productive work ethic by performing assigned tasks as directed; EC.5.A

   B. apply ethical reasoning to a variety of situations in order to make ethical decisions; and EC.5.B

   C. comply with all applicable rules, laws, and regulations in a consistent manner. EC.5.C

6. **The student participates in a paid career preparation experience. The student is expected to:** EC.6

   A. conduct, document, and evaluate learning activities in a supervised employment experience; EC.6.A

   B. develop advanced technical knowledge and skills related to the student's occupational objective; EC.6.B

   C. demonstrate growth of technical skill competencies; EC.6.C

   D. evaluate strengths and weaknesses in technical skill proficiency; and EC.6.D

   E. collect representative work samples. EC.6.E