

Chapter 123. Texas Essential Knowledge and Skills for Technology Education/Industrial Technology Education

Subchapter B. Exploratory, Middle School

Statutory Authority: The provisions of this Subchapter B issued under the Texas Education Code, §28.002, unless otherwise noted.

§123.11. Implementation of Texas Essential Knowledge and Skills for Technology Education/Industrial Technology Education, Exploratory, Middle School.

The provisions of Chapter 123, Subchapters A and B, shall supersede §75.50(b), (c), (f), and (g) of this title (relating to Introductory Industrial Technology) beginning September 1, 1998.

Source: The provisions of this §123.11 adopted to be effective September 1, 1998, 22 TexReg 5079.

§123.12. Exploring Communication Technology.

- (a) General requirements. This course is recommended for students in Grades 7-8. The prerequisite for this course is Technology Education.
- (b) Introduction. In Technology Education, students gain knowledge and skills in the application, design, production, and assessment of products, services, and systems. Knowledge and skills in the proper application of technology, the design of technology, the efficient production of technology, and the assessment of the effects of technology prepare students for success in the modern world. The study of technology allows students to reinforce, apply, and transfer their academic knowledge and skills to a variety of interesting and relevant activities, problems, and settings. In addition to their general academic and technical knowledge and skills, students gain an understanding of career opportunities available in technology and what employers require to gain and maintain employment in these careers.

(c) Knowledge and skills.

- (1) The student describes how a systems model can be used to describe communication activities.

The student is expected to:

- (A) identify the inputs, processes, output, and feedback associated with communication activities;
- (B) distinguish between photographic, digital graphic, printed graphic, technical graphic, audio, and video communication systems; and
- (C) describe how technological systems interact to achieve common goals.

- (2) The student uses communication technology to meet practical objectives.

The student is expected to:

- (A) apply communication technology to individual or community problems;

- (B) describe the factors that affect the use and interpretation of communication products; and
 - (C) identify and describe the roles of communication in business and industry, such as informing, persuading, and educating.
- (3) The student designs communication products using appropriate communication design processes and techniques.

The student is expected to:

 - (A) develop or improve communication products that meet specified needs; and
 - (B) identify areas where quality can be designed into communication products, services, or systems.
- (4) The student investigates emerging and innovative communication technologies.

The student is expected to:

 - (A) report on emerging and innovative communication technologies; and
 - (B) create a display that presents information on emerging and innovative technologies.
- (5) The student describes quality and how it is measured in communication.

The student is expected to:

 - (A) describe different quality control applications in communication; and
 - (B) apply continuous quality improvement techniques to the production of communication items.
- (6) The student produces communication items using the appropriate tools, equipment, machines, materials and technical processes.

The student is expected to:

 - (A) identify the chemical and physical properties of communication materials;
 - (B) identify the processes used in photographic, digital graphic, printed graphic, technical graphic, audio, and video communication systems;
 - (C) use a variety of tools, equipment, and machines; and
 - (D) produce communication items.
- (7) The student works safely with tools, equipment, machines, and materials used in communication technology.

The student is expected to:

 - (A) master relevant safety tests;
 - (B) follow safety manuals, instructions, and requirements;
 - (C) describe hazardous materials and wastes; and

- (8) The student describes the importance of maintenance in communication.
- (9) The student manages a communication technology project.
- (10) The student applies the appropriate codes, laws, standards, or regulations related to communication technology, such as Occupational Safety and Health Administration (OSHA), National Electrical Code (NEC), American Society for Testing Materials (ASTM), standard symbols, and line weights.
- (11) The student describes the intended and unintended effects of technological solutions.
- (12) The student identifies the factors that influence the evolution of communication technology.
- (D) dispose of hazardous materials and wastes appropriately.
- The student is expected to:
- (A) locate and perform manufacturers' maintenance procedures on selected tools, equipment, and machines; and
- (B) describe the results of improper maintenance.
- The student is expected to:
- (A) develop a plan for completing a communication technology project; and
- (B) participate in the organization and operation of a real or simulated communication project.
- The student is expected to:
- (A) describe the importance of codes, laws, standards, or regulations;
- (B) identify areas where codes, laws, standards, or regulations may be required; and
- (C) follow the appropriate codes, laws, standards, or regulations.
- The student is expected to:
- (A) use an assessment strategy to determine the risks and benefits of technological developments in communication;
- (B) describe how technology has affected individuals, societies, cultures, economies, and environments; and
- (C) discuss the international effects of communication technology.
- The student is expected to:
- (A) describe how changes in communication technology affect business and industry;
- (B) describe how the development and use of communication technology is influenced by past events;

- (C) describe change and the factors that affect the adoption or rejection of communication technology; and
 - (D) describe how and why technology evolves.

- (13) The student solves problems, thinks critically, and makes decisions related to communication technology.
 - The student is expected to:
 - (A) improve a product by following a problem-solving strategy;
 - (B) apply critical-thinking strategies to the analysis and evaluation of proposed technological solutions; and
 - (C) apply decision-making techniques to the selection of technological solutions.

- (14) The student describes the economic factors related to communication technology.
 - The student is expected to:
 - (A) develop a budget for a communication product or project;
 - (B) determine the most effective strategies to minimize costs;
 - (C) identify the financial factors associated with starting and operating communication enterprises; and
 - (D) explain the role of business in a free enterprise system.

- (15) The student applies communication, mathematics, and science knowledge and skills to communication activities.
 - The student is expected to:
 - (A) use audio and visual communication techniques consistent with industry standards;
 - (B) use mathematics concepts in communication technology;
 - (C) identify and apply science principles used in communication technology; and
 - (D) use the standard units of measure.

- (16) The student describes basic product marketing processes and techniques.
 - The student is expected to:
 - (A) prepare a marketing plan for a(n) idea, product, or service; and
 - (B) discuss the effect of customer satisfaction on the image of a product or company.

- (17) The student investigates career opportunities, requirements, and expectations in communication technology.

The student is expected to:

- (A) identify an area of interest in communication and investigate its entry level and advancement requirements; and
- (B) describe the careers available in communications.

- (18) The student describes the importance of teamwork, leadership, integrity, honesty, work habits, and organizational skills.

The student is expected to:

- (A) describe how teams function;
- (B) use teamwork to solve problems;
- (C) distinguish between the roles of team leaders and team members;
- (D) identify characteristics of good leaders;
- (E) identify employers' expectations and appropriate work habits;
- (F) define discrimination, harassment, and equality;
- (G) use time management techniques to develop and maintain work schedules and meet deadlines; and
- (H) complete his/her work according to established criteria.

Source: The provisions of this §123.12 adopted to be effective September 1, 1998, 22 TexReg 5079.

§123.13. Exploring Computer Applications.

- (a) General requirements. This course is recommended for students in Grades 7-8. The prerequisite for this course is Technology Education.
- (b) Introduction. In Technology Education, students gain knowledge and skills in the application, design, production, and assessment of products, services, and systems. Knowledge and skills in the proper application of technology, the design of technology, the efficient production of technology, and the assessment of the effects of technology prepare students for success in the modern world. The study of technology allows students to reinforce, apply, and transfer their academic knowledge and skills to a variety of interesting and relevant activities, problems, and settings. In addition to their general academic and technical knowledge and skills, students gain an understanding of career opportunities available in technology and what employers require to gain and maintain employment in these careers.

- (c) Knowledge and skills.

- (1) The student describes how a systems model can be used to describe computer hardware and software.

The student is expected to:

- (A) apply the universal systems model to computer activities;

- (B) identify the inputs, processes, outputs, and feedback associated with computer applications;
 - (C) distinguish between mainframe, workstation, personal, and other computer systems; and
 - (D) describe how technological systems interact to achieve common goals.

- (2) The student applies computer technology to specific tasks.

The student is expected to:

 - (A) apply computer technology to individual and community problems;
 - (B) identify and describe the roles of computer technology; and
 - (C) use computer technology to record, locate, analyze, present, and exchange information.

- (3) The student designs a product using a computer system and appropriate design processes and techniques.

The student is expected to:

 - (A) develop or improve a product or computer system that meets a specified need;
 - (B) use desktop publishing software to create a newsletter;
 - (C) use graphic software to create and modify images;
 - (D) use simulation software for research and development; and
 - (E) use machining software to machine or simulate the machining of a part.

- (4) The student investigates emerging and innovative computer technologies.

The student is expected to:

 - (A) report on emerging and innovative computer technologies; and
 - (B) create a display that presents information on emerging and innovative technologies.

- (5) The student describes quality and how it is measured in computer technology.

The student is expected to:

 - (A) distinguish between good and bad quality; and
 - (B) describe how customers perceive quality.

- (6) The student develops computer systems using the appropriate resources.
- The student is expected to:
- (A) describe the properties and characteristics of computer-related hardware and software; and
 - (B) identify, select, and sequence computer resources.
- (7) The student works safely with computer technology.
- The student is expected to:
- (A) master relevant safety tests;
 - (B) follow safety manuals, instructions, and requirements;
 - (C) describe hazardous materials and wastes associated with computer technology; and
 - (D) dispose of hazardous materials and wastes appropriately.
- (8) The student demonstrates proper computer and related-equipment maintenance.
- The student is expected to:
- (A) perform selected maintenance procedures on computer-related tools, equipment, and machines; and
 - (B) describe the results of improper maintenance.
- (9) The student manages a computer technology project or system.
- The student is expected to:
- (A) develop a plan for completing a computer technology project; and
 - (B) participate in the organization and operation of a real or simulated computer project.
- (10) The student applies the appropriate codes, laws, standards, or regulations related to computer technology, such as Occupational Safety and Health Administration (OSHA), National Electrical Code (NEC), American Society for Testing Materials (ASTM), copyright, and software piracy.
- The student is expected to:
- (A) describe the importance of codes, laws, standards, or regulations;
 - (B) identify areas where codes, laws, standards, or regulations may be required; and
 - (C) follow the appropriate codes, laws, standards, or regulations.

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| (11) The student describes the intended and unintended effects of technological solutions. | The student is expected to: <ul style="list-style-type: none">(A) use an assessment strategy to determine the risks and benefits of technological developments in computer technology;(B) describe how technology has affected individuals, societies, cultures, economies, and environments; and(C) discuss the international effects of computer technology. |
| (12) The student identifies the factors that influence the evolution of computer technology. | The student is expected to: <ul style="list-style-type: none">(A) describe how the development and use of computer technology is influenced by past events;(B) describe change and the factors that affect the adoption or rejection of computer technology; and(C) describe how and why technology evolves. |
| (13) The student solves problems, thinks critically, and makes decisions related to computer technology. | The student is expected to: <ul style="list-style-type: none">(A) develop or improve a product by following a problem-solving strategy;(B) apply critical-thinking strategies to the analysis and evaluation of proposed technological solutions; and(C) apply decision-making techniques to the selection of technological solutions. |
| (14) The student identifies the factors that influence the cost of producing goods and services with computer technology. | The student is expected to: <ul style="list-style-type: none">(A) develop a budget for a computer project; and(B) determine the most effective strategies to minimize costs. |
| (15) The student integrates his/her communication, mathematics, and science knowledge and skills with computer technology. | The student is expected to: <ul style="list-style-type: none">(A) use computer technology for written, verbal, and visual communication that is consistent with industry standards;(B) describe binary and hexadecimal numbering systems; and(C) identify and apply science principles used in computer technology. |

- (16) The student applies computer technology to the marketing of a product.
- The student is expected to:
- (A) prepare a marketing plan for a(n) idea, product, or service; and
 - (B) discuss the effect of customer satisfaction on the image of a product or company.
- (17) The student investigates career opportunities, requirements, and expectations in computer technology.
- The student is expected to:
- (A) identify an area of interest in computer technology and investigate its entry level and advancement requirements; and
 - (B) describe the careers available in computer technology.
- (18) The student describes the importance of teamwork, leadership, integrity, honesty, work habits, and organizational skills.
- The student is expected to:
- (A) describe how teams function;
 - (B) use teamwork to solve problems;
 - (C) distinguish between the roles of team leaders and team members;
 - (D) identify characteristics of good leaders;
 - (E) identify employers' expectations and appropriate work habits;
 - (F) define discrimination, harassment, and equality;
 - (G) use time management techniques to develop and maintain work schedules and meet deadlines; and
 - (H) complete his/her work according to established criteria.

Source: The provisions of this §123.13 adopted to be effective September 1, 1998, 22 TexReg 5079.

§123.14. Exploring Construction Technology.

- (a) General requirements. This course is recommended for students in Grades 7-8. The prerequisite for this course is Technology Education.
 - (b) Introduction. In Technology Education, students gain knowledge and skills in the application, design, production, and assessment of products, services, and systems. Knowledge and skills in the proper application of technology, the design of technology, the efficient production of technology, and the assessment of the effects of technology prepare students for success in the modern world. The study of technology allows students to reinforce, apply, and transfer their academic knowledge and skills to a variety of interesting and relevant activities, problems, and settings. In addition to their general academic and technical knowledge and skills, students gain an understanding of career opportunities available in technology and what employers require to gain and maintain employment in these careers.
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(c) Knowledge and skills.

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| (1) The student describes how a systems model can be used to describe construction activities. | The student is expected to: <ul style="list-style-type: none">(A) apply the universal systems model to construction activities;(B) identify the inputs, processes, outputs, and feedback associated with other systems used in construction;(C) distinguish between architectural and civil construction systems and related construction systems; and(D) describe how technological systems interact to achieve common goals. |
| (2) The student applies construction technology to specific tasks. | The student is expected to: <ul style="list-style-type: none">(A) apply construction technology to individual or community problems;(B) describe the factors that affect the purchase and use of constructed items; and(C) identify and describe the roles of construction. |
| (3) The student designs an item for construction using appropriate design processes and techniques. | The student is expected to: <ul style="list-style-type: none">(A) develop or improve a building or structure that meets a specified need; and(B) identify areas where quality, reliability, and safety can be designed into a building or structure. |

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| (4) The student investigates emerging and innovative construction technologies. | The student is expected to: <ul style="list-style-type: none">(A) report on emerging and innovative construction technologies; and(B) create a display that presents information on emerging and innovative technologies. |
| (5) The student describes quality and how it is measured in construction. | The student is expected to: <ul style="list-style-type: none">(A) distinguish between good and bad quality; and(B) describe how customers perceive quality. |
| (6) The student constructs buildings or structures using the appropriate tools, equipment, machines, materials and technical processes. | The student is expected to: <ul style="list-style-type: none">(A) identify the chemical, mechanical and physical properties and standard units of measure of construction materials;(B) identify the processes used in construction;(C) use a variety of tools, equipment, and machines to construct buildings or structures; and(D) construct an item. |
| (7) The student works safely with construction technology. | The student is expected to: <ul style="list-style-type: none">(A) master relevant safety tests;(B) follow safety manuals, instructions, and requirements;(C) describe hazardous materials and wastes; and(D) dispose of hazardous materials and wastes appropriately. |
| (8) The student describes the importance of maintenance in construction. | The student is expected to: <ul style="list-style-type: none">(A) locate and perform manufacturers' maintenance procedures on selected tools, equipment, and machines; and(B) describe the results of improper maintenance. |
| (9) The student manages a construction technology project or system. | The student is expected to: <ul style="list-style-type: none">(A) develop a plan for completing a construction technology project; and |

- (10) The student applies the appropriate codes, laws, standards, or regulations related to construction technology, such as Occupational Safety and Health Administration (OSHA), National Electrical Code (NEC), American Society for Testing Materials (ASTM), standard symbols, and line weights.
- (11) The student describes the intended and unintended effects of technological solutions.
- (12) The student identifies the factors that influence the evolution of construction technology.
- (13) The student demonstrates the ability to solve problems, think critically, and make decisions.
- (B) participate in the organization and operation of a real or simulated construction project.
- The student is expected to:
- (A) describe the importance of codes, laws, standards, or regulations;
- (B) identify areas where codes, laws, standards, or regulations may be required; and
- (C) follow the appropriate codes, laws, standards, or regulations.
- The student is expected to:
- (A) use an assessment strategy to determine the risks and benefits of technological developments in construction;
- (B) describe how technology has affected individuals, societies, cultures, economies, and environments; and
- (C) discuss the international effects of construction technology.
- The student is expected to:
- (A) describe how changes in construction technology affect business and industry;
- (B) describe how the development and use of construction technology is influenced by past events;
- (C) describe change and the factors that affect the adoption or rejection of construction technology;
- (D) describe how and why technology evolves; and
- (E) describe issues related to regional and community planning.
- The student is expected to:
- (A) develop or improve a building or structure by following a problem-solving strategy;
- (B) apply critical-thinking strategies to the analysis and evaluation of proposed technological solutions; and

- (C) apply decision-making techniques to the selection of technological solutions.
- (14) The student describes the factors related to the cost of construction projects.
- The student is expected to:
- (A) develop a budget for a construction project;
- (B) determine the most effective strategies to minimize costs;
- (C) identify the financial factors associated with starting and operating construction enterprises; and
- (D) explain the role of business in a free enterprise system.
- (15) The student applies his/her communication, mathematics, and science knowledge and skills to construction activities.
- The student is expected to:
- (A) use written, verbal, and visual communication techniques consistent with industry standards;
- (B) use mathematics concepts in construction technology; and
- (C) identify and apply science principles used in construction technology.
- (16) The student describes basic product marketing in construction.
- The student is expected to:
- (A) prepare a marketing plan for a(n) idea, product, or service; and
- (B) discuss the effect of customer satisfaction on the image of a product or company.
- (17) The student investigates career opportunities, requirements, and expectations in construction technology.
- The student is expected to:
- (A) identify an area of interest in construction and investigate its entry level and advancement requirements; and
- (B) describe the careers available in construction.
- (18) The student describes the importance of teamwork, leadership, integrity, honesty, work habits, and organizational skills.
- The student is expected to:
- (A) describe how teams function;
- (B) use teamwork to solve problems;
- (C) distinguish between the roles of team leaders and team members;
- (D) identify characteristics of good leaders;

- (E) identify employers' expectations and appropriate work habits;
- (F) define discrimination, harassment, and equality;
- (G) use time management techniques to develop and maintain work schedules and meet deadlines; and
- (H) complete his/her work according to established criteria.

Source: The provisions of this §123.14 adopted to be effective September 1, 1998, 22 TexReg 5079.

§123.15. Exploring Energy, Power, and Transportation Technology.

- (a) General requirements. This course is recommended for students in Grades 7-8. The prerequisite for this course is Technology Education.
- (b) Introduction. In Technology Education, students gain knowledge and skills in the application, design, production, and assessment of products, services, and systems. Knowledge and skills in the proper application of technology, the design of technology, the efficient production of technology, and the assessment of the effects of technology prepare students for success in the modern world. The study of technology allows students to reinforce, apply, and transfer their academic knowledge and skills to a variety of interesting and relevant activities, problems, and settings. In addition to their general academic and technical knowledge and skills, students gain an understanding of career opportunities available in technology and what employers require to gain and maintain employment in these careers.

(c) Knowledge and skills.

- (1) The student describes how a systems model can be used to describe energy, power, and transportation activities.

The student is expected to:

- (A) apply the universal systems model to energy, power, and transportation activities;
- (B) identify the inputs, processes, outputs, and feedback associated with energy, power, and transportation systems;
- (C) distinguish between mechanical, fluid, electrical, and thermal power systems;
- (D) distinguish between various forms of energy;
- (E) describe the differences between the various transportation modes, such as land, marine, air, and space;
- (F) describe the technological systems in transportation, such as propulsion, suspension, guidance, control, support, and structure; and

- (G) describe how technological systems interact to achieve common goals.
- (2) The student applies energy, power, and transportation technology to specific tasks.
- The student is expected to:
- (A) apply energy, power, and transportation technology to individual and community problems;
- (B) describe the factors that affect the purchase and use of energy, power, and transportation technology; and
- (C) identify and describe the roles of energy, power, and transportation.
- (3) The student designs energy, power, and transportation products or services using appropriate design processes and techniques.
- The student is expected to:
- (A) develop or improve energy, power, and transportation products or services that meet a specified need; and
- (B) identify areas where quality, reliability, and safety can be designed into a product, service, or system.
- (4) The student investigates emerging and innovative energy, power, and transportation technologies.
- The student is expected to:
- (A) report on emerging and innovative energy, power, and transportation technologies; and
- (B) create a display that presents information on emerging and innovative technologies.
- (5) The student describes quality and how it is measured in energy, power, and transportation.
- The student is expected to:
- (A) distinguish between good and bad quality; and
- (B) describe how customers perceive quality.
- (6) The student builds energy, power, and transportation devices using the appropriate tools, equipment, machines, materials and technical processes.
- The student is expected to:
- (A) describe the chemical, mechanical and physical properties and standard units of measure of energy, power, and transportation materials and resources;
- (B) contrast the characteristics and sources of energy and power;
- (C) describe the processes used in energy, power, and transportation, such as conversion, control, transmission, and storage;

- (D) describe the processes used in transportation, such as receiving, holding/storing, loading, moving, unloading, and delivering;
 - (E) use a variety of tools, equipment, and machines to build energy, power, and transportation items; and
 - (F) build an energy, power, and transportation product or system.

- (7) The student works safely with energy, power, and transportation technology.
 - The student is expected to:
 - (A) master relevant safety tests;
 - (B) follow safety manuals, instructions, and requirements;
 - (C) describe hazardous materials and wastes; and
 - (D) dispose of hazardous materials and wastes appropriately.

- (8) The student describes the importance of maintenance in energy, power, and transportation.
 - The student is expected to:
 - (A) locate and perform manufacturers' maintenance procedures on selected tools, equipment, and machines; and
 - (B) describe the results of improper maintenance.

- (9) The student manages an energy, power, and transportation technology project or system.
 - The student is expected to:
 - (A) develop a plan for completing an energy, power, and transportation technology project; and
 - (B) participate in the organization and operation of a real or simulated energy, power, and transportation project.

- (10) The student applies the appropriate codes, laws, standards, or regulations related to energy, power, and transportation technology, such as Occupational Safety and Health Administration (OSHA), National Electrical Code (NEC), American Society for Testing Materials (ASTM), standard symbols, and line weights.
 - The student is expected to:
 - (A) describe the importance of codes, laws, standards, or regulations;
 - (B) identify areas where codes, laws, standards, or regulations may be required; and
 - (C) follow the appropriate codes, laws, standards, or regulations.

- (11) The student describes the intended and unintended effects of technological solutions.
- The student is expected to:
- (A) use an assessment strategy to determine the risks and benefits of technological developments in energy, power, and transportation;
 - (B) describe how technology has affected individuals, societies, cultures, economies, and environments; and
 - (C) discuss the international effects of energy, power, and transportation technology.
- (12) The student identifies the factors that influence the evolution of energy, power, and transportation technology.
- The student is expected to:
- (A) describe how changes in energy, power, and transportation technology affect business and industry;
 - (B) describe how the development and use of energy, power, and transportation technology is influenced by past events;
 - (C) describe change and the factors that affect the adoption or rejection of energy, power, and transportation technology; and
 - (D) describe how and why technology evolves.
- (13) The student solves problems, thinks critically, and makes decisions related to energy, power, and transportation technology.
- The student is expected to:
- (A) develop or improve an energy, power, and transportation product or service by following a problem-solving strategy;
 - (B) apply critical-thinking strategies to the analysis and evaluation of proposed technological solutions; and
 - (C) apply decision-making techniques to the selection of technological solutions.
- (14) The student describes the economic factors related to energy, power, and transportation technology.
- The student is expected to:
- (A) develop a budget for an energy, power, and transportation project;
 - (B) determine the most effective strategies to minimize costs;

- (15) The student applies his/her communication, mathematics, and science knowledge and skills to energy, power, and transportation activities.

 - (C) identify the financial factors associated with starting and operating energy, power, and transportation enterprises; and
 - (D) explain the role of business in a free enterprise system.

The student is expected to:

 - (A) use written, verbal, and visual communication techniques consistent with industry standards;
 - (B) use mathematics concepts in energy, power, and transportation technology; and
 - (C) identify and apply science principles used in energy, power, and transportation technology.

- (16) The student describes the marketing of energy, power, and transportation products and services.

The student is expected to:

 - (A) prepare a marketing plan for a(n) idea, product, or service; and
 - (B) discuss the effect of customer satisfaction on the image of a product or company.

- (17) The student investigates career opportunities, requirements, and expectations in energy, power, and transportation technology.

The student is expected to:

 - (A) identify an area of interest in energy, power, and transportation, and investigate its entry level and advancement requirements; and
 - (B) describe the careers available in energy, power, and transportation.

- (18) The student describes the importance of teamwork, leadership, integrity, honesty, work habits, and organizational skills.

The student is expected to:

 - (A) describe how teams function;
 - (B) use teamwork to solve problems;
 - (C) distinguish between the roles of team leaders and team members;
 - (D) identify characteristics of good leaders;
 - (E) identify employers' expectations and appropriate work habits;
 - (F) define discrimination, harassment, and equality;
 - (G) use time management techniques to develop and maintain work schedules and meet deadlines; and

- (H) complete his/her work according to established criteria.

Source: The provisions of this §123.15 adopted to be effective September 1, 1998, 22 TexReg 5079.

§123.16. Exploring Manufacturing Technology.

- (a) General requirements. This course is recommended for students in Grades 7-8. The prerequisite for this course is Technology Education.
- (b) Introduction. In Technology Education, students gain knowledge and skills in the application, design, production, and assessment of products, services, and systems. Knowledge and skills in the proper application of technology, the design of technology, the efficient production of technology, and the assessment of the effects of technology prepare students for success in the modern world. The study of technology allows students to reinforce, apply, and transfer their academic knowledge and skills to a variety of interesting and relevant activities, problems, and settings. In addition to their general academic and technical knowledge and skills, students gain an understanding of career opportunities available in technology and what employers require to gain and maintain employment in these careers.

(c) Knowledge and skills.

- (1) The student describes how a systems model can be used to describe manufacturing activities.

The student is expected to:

- (A) apply the universal systems model to manufacturing activities;
- (B) identify the inputs, processes, outputs, and feedback associated with manufacturing systems;
- (C) distinguish between continuous, intermittent, custom, and other manufacturing systems; and
- (D) describe how technological systems interact to achieve common goals.

- (2) The student applies manufacturing technology to specific tasks.

The student is expected to:

- (A) apply manufacturing technology to individual or community problems;
- (B) describe the factors that affect the purchase and use of manufacturing items; and
- (C) identify and describe the roles of manufacturing.

- (3) The student designs a product or manufacturing system using appropriate design processes and techniques.

The student is expected to:

- (A) develop or improve a product or manufacturing system that meets a specified need; and

- (B) identify areas where quality, reliability, and safety can be designed into a product or system.
- (4) The student investigates emerging and innovative manufacturing technologies.
 - The student is expected to:
 - (A) report on emerging and innovative manufacturing technologies; and
 - (B) create a display that presents information on emerging and innovative technologies.
- (5) The student describes quality and how it is measured in manufacturing.
 - The student is expected to:
 - (A) distinguish between good and bad quality; and
 - (B) describe how customers perceive quality.
- (6) The student builds products or systems using the appropriate tools, equipment, machines, materials and technical processes.
 - The student is expected to:
 - (A) identify the chemical, mechanical, and physical properties of manufacturing materials;
 - (B) identify the processes used in manufacturing;
 - (C) use a variety of tools, equipment, and machines to manufacture products; and
 - (D) manufacture an item.
- (7) The student works safely with tools, equipment, machines, and materials used in manufacturing technology.
 - The student is expected to:
 - (A) master relevant safety tests;
 - (B) follow safety manuals, instructions, and requirements;
 - (C) describe hazardous materials and wastes; and
 - (D) dispose of hazardous materials and wastes appropriately.
- (8) The student describes the importance of maintenance in manufacturing.
 - The student is expected to:
 - (A) locate and perform manufacturers' maintenance procedures on selected tools, equipment, and machines; and
 - (B) describe the results of improper maintenance.

(9) The student manages a manufacturing technology project or system.

The student is expected to:

- (A) develop a plan for completing a manufacturing project; and
- (B) participate in the organization and operation of a real or simulated manufacturing project.

(10) The student applies the appropriate codes, laws, standards, or regulations related to manufacturing technology, such as Occupational Safety and Health Administration (OSHA), National Electrical Code (NEC), American Society for Testing Materials (ASTM), standard symbols, and line weights.

The student is expected to:

- (A) describe the importance of codes, laws, standards, or regulations;
- (B) identify areas where codes, laws, standards, or regulations may be required; and
- (C) follow the appropriate codes, laws, standards, or regulations.

(11) The student describes the intended and unintended effects of technological solutions.

The student is expected to:

- (A) use an assessment strategy to determine the risks and benefits of technological developments in manufacturing;
- (B) describe how technology has affected individuals, societies, cultures, economies, and environments; and
- (C) discuss the international effects of manufacturing technology.

(12) The student identifies the factors that influence the evolution of manufacturing technology.

The student is expected to:

- (A) describe how changes in manufacturing technology affect business and industry;
- (B) describe how the development and use of manufacturing technology is influenced by past events;
- (C) describe change and the factors that affect the adoption or rejection of manufacturing technology; and
- (D) describe how and why technology evolves.

(13) The student solves problems, thinks critically, and makes decisions related to manufacturing technology.

The student is expected to:

- (A) develop or improve a product by following a problem-solving strategy;
- (B) apply critical-thinking strategies to the analysis and evaluation of proposed technological solutions; and

- (14) The student identifies the factors that influence the cost of producing goods and services in manufacturing.
- (15) The student applies his/her communication, mathematics, and science knowledge and skills to manufacturing activities.
- (16) The student describes basic product marketing processes and techniques.
- (17) The student investigates career opportunities, requirements, and expectations in manufacturing technology.
- (18) The student describes the importance of teamwork, leadership, integrity, honesty, work habits, and organizational skills.
- (C) apply decision-making techniques to the selection of technological solutions.
- The student is expected to:
- (A) develop a budget for manufacturing a product;
- (B) determine the most effective strategies to minimize costs;
- (C) identify the financial factors associated with starting and operating manufacturing enterprises; and
- (D) explain the role of business in a free enterprise system.
- The student is expected to:
- (A) use written, verbal, and visual communication techniques consistent with industry standards;
- (B) use mathematics concepts in manufacturing technology;
- (C) identify and apply science principles used in manufacturing technology; and
- (D) use the appropriate units of measure.
- The student is expected to:
- (A) prepare a marketing plan for a(n) idea, product, or service; and
- (B) discuss the effect of customer satisfaction on the image of a product or company.
- The student is expected to:
- (A) identify an area of interest in manufacturing and investigate its entry-level and advancement requirements; and
- (B) describe the careers available in manufacturing.
- The student is expected to:
- (A) describe how teams function;
- (B) use teamwork to solve problems;
- (C) distinguish between the roles of team leaders and team members;
- (D) identify characteristics of good leaders;

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- (E) identify employers' expectations and appropriate work habits;
- (F) define discrimination, harassment, and equality;
- (G) use time management techniques to develop and maintain work schedules and meet deadlines; and
- (H) complete his/her work according to established criteria.

Source: The provisions of this §123.16 adopted to be effective September 1, 1998, 22 TexReg 5079.

