

EXPLORING TECHNOLOGY

Industrial Technology

Biotechnology

Curriculum Standard One: The student will understand the application of biology and technology. The student will demonstrate and explain methods of biotechnology in the investigation of living systems (agriculture, bioprocessing, health, and medicine).		
Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>1. The student will know that bio-related technologies are related to plant and animal life.</p> <p>2. The student will explain how biotechnology developed.</p> <p>3. The student will know the impact of the newer bio-related technologies.</p> <p>4. The student will be able to discuss bio-ethics.</p>	<p>A. Can the student define biotechnology?</p> <p>A. Can the student give examples of the earliest forms of bio-related technology?</p> <p>B. Can the student explain the importance of science to the development of biotechnology?</p> <p>A. Can the student give at least five examples of biotechnology evident in today's households?</p> <p>B. Can the student give at least five examples of biotechnology in our community?</p> <p>A. Can the student explain the role of ethics in bio-related technologies?</p>	<ul style="list-style-type: none"> • The student will pass a vocabulary test and written test on biotechnology. • The student will develop a chart of bio-related technology forms. • The student will give a PowerPoint presentation about the development of biotechnology. • The student will list five examples of biotechnology. • The student will identify five examples of biotechnology evident in our community. • The student will identify at least two examples of bio-ethics.

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Communication

<p>Curriculum Standard Two: The student will understand a variety of communication processes (audio, computer-aided design, electronic, laser, visual) and their importance in communications technologies. The student will use different processes and media to communicate a message.</p>		
Performance Objective	Critical Attributes	Benchmarks/Assessment
1. The student will be able to define communication technology and explain the importance of communications systems.	<p>A. Can the student define and give examples of communications technologies?</p> <p>B. Can the student explain the benefits of some current communication systems?</p>	<ul style="list-style-type: none"> • The student will satisfactorily pass a test that includes the definition of communications technologies and related terms. • The student will explain either orally or in writing the importance of communication systems.
2. The student will be able to identify trends in communication systems.	<p>A. Can the student recognize and identify a trend?</p>	<ul style="list-style-type: none"> • The student will identify at least one communication systems trend.
3. The student will explain some of the impacts of communication systems.	<p>A. Can the student select a means of communication and explain its effects on individual groups or society in general?</p>	<ul style="list-style-type: none"> • The student will select a communication system and explain its impact.
4. The student will communicate with others using a variety of processes and media.	<p>A. Can the student demonstrate communication skills using several methods?</p>	<ul style="list-style-type: none"> • The student will use at least three processes or media to communicate a message.

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Construction

Curriculum Standard Three: The student will understand a variety of construction processes (planning, framing, plumbing, wiring) and their importance in construction technology. The student will build models or projects incorporating these processes.		
Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>1. The student will be able to define and give examples of four basic types of construction: residential, industrial, commercial, and public works.</p>	<p>A. Can the student describe the four basic types of construction and identify at least one example of each?</p>	<ul style="list-style-type: none"> • The student will list an example of each type of construction.
<p>2. The student will identify and explain how resources are used in construction (e.g., people, information, materials, tools and machines, energy, capital and time).</p>	<p>A. Can the student list the resources and tell how each is used in construction?</p>	<ul style="list-style-type: none"> • The student will develop a bill of materials list for their specific construction project.
<p>3. The student will be able to detail some advantages and disadvantages of several types of structural materials.</p>	<p>A. Can the student identify the best and worst materials for a specific project?</p>	<ul style="list-style-type: none"> • Given a hypothetical construction project, the student will select the appropriate materials and explain the reason for using these materials. • The student will select the appropriate materials for his/her own project.
<p>4. The student will be able to discuss regulations that apply to construction.</p>	<p>A. Can the student explain the reason for regulations?</p>	<ul style="list-style-type: none"> • The student will develop a matrix for regulations used in the construction industry.
<p>5. The student will list the steps in the design process used for construction.</p>	<p>A. Can the student define the term "zoning laws"?</p>	<ul style="list-style-type: none"> • The student will take a test concerning zoning law applications.

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Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>6. The student will know the titles and descriptions of jobs in related construction fields.</p>	<p>B. Can the student explain the benefits of scale drawings, a site plan, a floor plan, and detail drawings?</p> <p>A. Can the student describe the skills, aptitudes, and education requirements for careers related to construction?</p>	<ul style="list-style-type: none">• The student will develop a scale drawing of a house or project for evaluation by the teacher establish rubric.• The student will research and write about job opportunities in the construction field.

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Machine and Tool Safety

***Curriculum Standard Four:* The student will understand the safe and appropriate use of tools and machines. The student will demonstrate the correct operation of tools and machines for form, separate, combine, and condition materials.**

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>1. The student will know and demonstrate the safety procedures appropriate for the lab setting.</p> <p>2. The student will be able to explain the purpose of Occupational Safety and Health Administration (OSHA).</p>	<p>A. Can the student handle and properly dispose of hazardous chemicals?</p> <p>B. Can the student demonstrate correct and safe use of tools and equipment?</p> <p>A. Can the student explain what OSHA stands for and the purpose of the department?</p>	<ul style="list-style-type: none"> • The student will pass a written safety test with a score of 100%. • The student will practice safe use of tools and hazardous materials. • On a test, the student will correctly identify the function of OSHA.

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Manufacturing

Curriculum Standard Five: The student will understand a variety of manufacturing processes (research, tooling, casting, forming, combining, conditioning) and their importance in manufacturing technology. The student will create models or products incorporating different processes.

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>1. The student will develop an understanding of the history of manufacturing.</p>	<p>A. Can the student briefly describe a few significant developments in the history of manufacturing (cottage industries, factory system, and industrial revolution)?</p>	<ul style="list-style-type: none"> • The student will correctly answer quiz or test questions about manufacturing history.
<p>2. The student will explain how manufacturing and the economy influence each other.</p>	<p>A. Can the student select a manufactured product and explain how it influences the economy or vice versa?</p>	<ul style="list-style-type: none"> • In a test setting, the student will generalize about the relationship between manufactured products and the economy. • The student will select a manufactured product and research its influence on the economy.
<p>3. The student will understand the four parts (inputs, outputs, processes, and feedback) of a manufactured production system and be able to demonstrate the system.</p>	<p>A. Can the student define and give an example of each of the four parts?</p>	<ul style="list-style-type: none"> • The student will demonstrate the manufacturing production system in a hypothetical and/or actual setting.

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Manufacturing

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>4. The student will know and demonstrate the three types of drawings used in manufacturing:</p> <ul style="list-style-type: none"> • thumbnail sketches • rough sketches • renderings 	<p>A. Can the student describe each type of drawing?</p>	<ul style="list-style-type: none"> • When designing a manufactured item, the student will use each type of drawing.
<p>5. The student will create a mock-up of a proposed product.</p>	<p>A. Can the student explain the purpose of a mock-up?</p> <p>B. Can the student create an accurate mock-up of his/her project?</p>	<ul style="list-style-type: none"> • The student will create a mock-up representing a product he/she intends to manufacture. • The student will build a project to the drawings submitted and will be graded on the established rubric.

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Materials

Curriculum Standard Six: The student will understand the ways in which raw materials (animal, mineral, vegetable) are collected and processed to produce industrial materials (composite, metal, wood products). The student will demonstrate and explain the processes and tests used to produce and recycle common industrial materials.

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>1. The student will be able to define and give an example of each of these items:</p> <ul style="list-style-type: none"> • natural materials • synthetic materials • raw materials • industrial materials • standard stock • alloy • composite • ceramics 	<p>A. Can the student define each term and name an example?</p>	<ul style="list-style-type: none"> • The student will use the correct terminology and identification when referring to various production materials.
<p>2. The student will understand the following processing methods for materials:</p> <ul style="list-style-type: none"> • forming • separating • conditioning • combining 	<p>A. Can the student explain each process and identify an example of each?</p>	<ul style="list-style-type: none"> • The student will categorize materials according to the processing method.

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Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>3. The student will understand and demonstrate each of the following testing methods and importance of testing:</p> <ul style="list-style-type: none">• hardness• tensile strength• compression strength• fatigue strength	<p>A. Can the student determine the appropriate testing method(s) based on the end use of material?</p>	<ul style="list-style-type: none">• For each of the testing methods, the student will select a material, then design and perform a test, reporting the results.

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Power and Energy

Curriculum Standard Seven: The student will understand sources and systems of power and energy (electrical, simple machines, solar, thermal, water, wind). The student will build models or projects incorporating different processes.

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>1. The student will be able to distinguish between energy and power.</p> <p>2. The student will be able to define and give an example of these sources of energy:</p> <ul style="list-style-type: none"> • inexhaustible • renewable • nonrenewable <p>3. The student will identify the forms of energy used by technology systems:</p> <ul style="list-style-type: none"> • heat (thermal) • light (solar) • sound • chemical • nuclear • mechanical • electrical • water 	<p>A. Can the student identify examples of energy and power?</p> <p>A. Can the student categorize various forms of energy into the three sources of energy?</p> <p>A. Can the student identify an example of each form of energy (e.g., battery/electricity, turbine engine/heat, and water)?</p>	<ul style="list-style-type: none"> • The student will complete and pass tests about energy sources, forms and systems, with a grade of at least 70%. • The student will create a matrix for evaluation to categorize energy forms. • The student will be tested to identify examples of energy. Teacher to develop the test.

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Power and Energy

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>4. The student will complete at least one model or project incorporating at least two different processes.</p>	<p>A. Can the student build a project that utilizes at least two power/energy processes?</p>	<ul style="list-style-type: none">• The student will construct a model following the specifications of the assignment.

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Transportation

<p>Curriculum Standard Eight: The student will understand the applications of transportation technology in relation to land, water, air, and space. The student will incorporate the technology into the design and construction of a model or functional vehicle.</p>		
Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>1. The student will be able to name the five modes of transportation and types of vehicles used for each.</p>	<p>A. Can the student identify the five modes of transportation?</p> <p>B. Can the student match vehicles to transportation mode?</p>	<ul style="list-style-type: none"> • The student will list the modes of transportation and at least one vehicle for each. • Given specific scenarios, the student will select one mode of transportation and justify the choice. • Following specific design and construction criteria, the student will design and build a model or functional vehicle representing one mode of transportation.
<p>2. The student will explain the reasons for selecting one mode over another.</p>	<p>A. Can the student explain the reason why a city selects light rail instead of a subway system?</p>	
<p>3. The student will select a mode of transportation, then design and construct an appropriate model or functional vehicle.</p>	<p>A. Can the student incorporate transportation technology into a model vehicle?</p>	

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Career Exploration

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***Curriculum Standard Nine:* The student will develop a knowledge base that will lead to sound career choices. The student will identify the knowledge, skills, training, and education requirements associated with technology careers.**

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>1. The student will explore career opportunities available in the field of industrial technology.</p> <p>2. The student will understand the career paths available and the education, skills, and training requirements of technology careers.</p>	<p>A. Can the student identify at least one career in each of the technology fields explored in this course?</p> <p>B. Can the student identify occupations of interest to him/her?</p> <p>A. Can the student identify the relationship between skills, education, and income?</p> <p>B. Can the student articulate the education requirements for an occupation/career in which he/she is interested?</p>	<ul style="list-style-type: none"> • The student will list at least one occupation in each of the career areas. • The student will identify at least one occupation that is of interest. • The student will outline the requirements for entry-level, journeyman, and management-level technology careers. • The student will complete an individual career plan.