



Technology Interactions

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STANDARDS	PAGE REFERENCES
Technology/Engineering, Grades 6–8	
<p>1. Materials, Tools, and Machines <i>Central Concept:</i> Appropriate materials, tools, and machines enable us to solve problems, invent, and construct.</p>	
<p>1.1 Given a design task, identify appropriate materials (e.g., wood, paper, plastic, aggregates, ceramics, metals, solvents, adhesives) based on specific properties and characteristics (e.g., strength, hardness, and flexibility).</p>	<p>Student Edition: 64-66, 88-95, 106-107 <i>Design, Build & Evaluate</i> 80-81, 98-101 <i>Impact of Technology</i> 92 <i>Materials and Equipment</i> 98, 101, 144 <i>Math Link</i> 64 <i>Reading Link</i> 94 <i>Science Link</i> 65, 97, 111 <i>Writing Link</i> 93</p> <p>Student CD: <i>Extending Your Learning</i> Materials Science <i>Interactive Labs</i> Properties of Materials, Safety Data Sheets, The Seven Resources of Technology</p>

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<p>1.2 Identify and explain appropriate measuring tools, hand tools, and power tools used to hold, lift, carry, fasten, and separate, and explain their safe and proper use.</p>	<p>Student Edition: 108-111</p> <p>Student CD: <i>Extending Your Learning</i> Manufacturing Technologies <i>Interactive Labs</i> Hand Tools, Measurement, Power Tools and Machines, Secondary Processes, Safety Data Sheets, The Seven Resources of Technology</p>
<p>1.3 Identify and explain the safe and proper use of measuring tools, hand tools, and machines (e.g., band saw, drill press, sander, hammer, screwdriver, pliers, tape measure, screws, nails, and other mechanical fasteners) needed to construct a prototype of an engineering design.</p>	<p>Student Edition: 108-111 <i>Design, Build & Evaluate</i> 96-97, 122-123, 144-145 <i>Materials and Equipment</i> 96, 122, 124</p> <p>Student CD: <i>Extending Your Learning</i> Manufacturing Technologies <i>Interactive Labs</i> Hand Tools, Measurement, Power Tools and Machines, Secondary Processes, Safety Data Sheets, The Seven Resources of Technology</p>
<p>2. Engineering Design <i>Central Concept:</i> Engineering design is an iterative process that involves modeling and optimizing to develop technological solutions to problems within given constraints.</p>	
<p>2.1 Identify and explain the steps of the engineering design process, i.e., identify the need or problem, research the problem, develop possible solutions, select the best possible solution(s), construct a prototype, test and evaluate, communicate the solution(s), and redesign.</p>	<p>Student Edition: 26-30, 48-50, 106 <i>Design, Build & Evaluate</i> 34-39, 56-57, 80-81, 122-125, 374-379</p> <p>Student CD: <i>Reviewing the Main Ideas</i> Design and Engineering, Structural Engineering</p>

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<p>2.2 Demonstrate methods of representing solutions to a design problem, e.g., sketches, orthographic projections, multiview drawings.</p>	<p>Student Edition: 28-29, 43-51, 371-372 <i>Design, Build & Evaluate</i> 52-57 <i>Impact of Technology</i> 51 <i>Math Link</i> 43 <i>Reading Link</i> 50 <i>Writing Link</i> 44</p> <p>Student CD: <i>Extending Your Learning</i> Computer-Aided Design <i>Interactive Labs</i> Cartesian Coordinate System <i>Reviewing the Main Ideas</i> Computer-Aided Design</p>
<p>2.3 Describe and explain the purpose of a given prototype.</p>	<p>Student Edition: 28 <i>Design, Build & Evaluate</i> 52-57, 78-81, 98-101, 124-125, 144-149, 168-173, 218-223, 244-251, 332-337, 358-359, 374-379, 394-399, 414-419, 458-459</p> <p>Student CD: <i>Interactive Labs</i> Create a Zoetrope</p>
<p>2.4 Identify appropriate materials, tools, and machines needed to construct a prototype of a given engineering design.</p>	<p>Student Edition: 28, 88-94, 108-110 <i>Impact of Technology</i> 92 <i>Materials and Equipment</i> 56, 78, 80, 98, 101, 124, 144, 146, 148, 168, 170, 172, 192, 218, 221, 222, 244, 247, 250, 310, 333, 334, 336, 358, 374, 376, 378, 394, 397, 414, 416, 418, 458</p> <p>Student CD: <i>Extending Your Learning</i> Materials Science <i>Interactive Labs</i> Hand Tools, Power Tools and Machines</p>

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<p>2.5 Explain how such design features as size, shape, weight, function, and cost limitations would affect the construction of a given prototype.</p>	<p>Student Edition: 28 <i>Design, Build & Evaluate</i> 52-57, 78-81, 98-101, 124-125, 144-149, 168-173, 218-223, 244-251, 332-337, 358-359, 374-379, 394-399, 414-419, 458-459</p> <p>Student CD: <i>Interactive Labs</i> Create a Zoetrope, The Seven Resources of Technology</p>
<p>2.6 Identify the five elements of a universal systems model: goal, inputs, processes, outputs, and feedback.</p>	<p>Student Edition: 26-30, 104-115, 365-373, 385-391 <i>Design, Build & Evaluate</i> 120-123, 218-221, 334-335</p> <p>Student CD: <i>Interactive Labs</i> The Systems Model</p>
<p>3. Communication Technologies <i>Central Concept:</i> Ideas can be communicated through engineering drawings, written reports, and pictures.</p>	
<p>3.1 Identify and explain the components of a communication system, i.e., source, encoder, transmitter, receiver, decoder, storage, retrieval, and destination.</p>	<p>Student Edition: 275-283, 348 <i>Design, Build & Evaluate</i> 354-355</p> <p>Student CD: <i>Interactive Labs</i> Designed World</p>
<p>3.2 Identify and explain the appropriate tools, machines, and electronic devices (e.g., drawing tools, computer-aided design, and cameras) used to produce and/or reproduce design solutions (e.g., engineering drawings, prototypes, and reports).</p>	<p>Student Edition: 43-51, 255-265, 283-285 <i>Impact of Technology</i> 51 <i>Materials and Equipment</i> 52, 266, 269, 271, 290, 294, 310, 314</p> <p>Student CD: <i>Extending Your Learning</i> Computer-Aided Design, Graphic Communication <i>Interactive Labs</i> Designed World, Four-Color Printing, Multimedia Ad</p>

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<p>3.3 Identify and compare communication technologies and systems, i.e., audio, visual, printed, and mass communication.</p>	<p>Student Edition: 255-265, 275-289, 299-309 <i>Design, Build & Evaluate</i> 266-271, 290-295, 310-315 <i>Impact of Technology</i> 285, 302 <i>Reading Link</i> 260 <i>Science Link</i> 263, 278 <i>Writing Link</i> 261, 288</p> <p>Student CD: <i>Extending Your Learning</i> Graphic Communication, Digital Multimedia, Animation <i>Interactive Labs</i> Cochlear Implants, Forms of Energy, Multimedia Ad, Systems Model</p>
<p>3.4 Identify and explain how symbols and icons (e.g., international symbols and graphics) are used to communicate a message.</p>	<p>Student Edition: 39, 242-243, 370-372 <i>Design, Build & Evaluate</i> 268-269, 334-335 <i>Reading Link</i> 50, 242 <i>Writing Link</i> 388</p> <p>Student CD: <i>Interactive Labs</i> Flowcharts, Series, Parallel, and Combination Circuits</p>
<p>4. Manufacturing Technologies <i>Central Concept:</i> Manufacturing is the process of converting raw materials (primary process) into physical goods (secondary process), involving multiple industrial processes (e.g., assembly, multiple stages of production, quality control).</p>	
<p>4.1 Describe and explain the manufacturing systems of custom and mass production.</p>	<p>Student Edition: 105-119 <i>Design, Build & Evaluate</i> 120-123</p> <p>Student CD: <i>Extending Your Learning</i> Manufacturing Technologies <i>Interactive Labs</i> Primary Processes, Secondary Processes, Seven Resources of Technology, Systems Model</p>

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<p>4.2 Explain and give examples of the impacts of interchangeable parts, components of mass-produced products, and the use of automation, e.g., robotics.</p>	<p>Student Edition: 111-112, 119, 383-393 <i>Design, Build & Evaluate</i> 120-123, 396-399 <i>Impact of Technology</i> 391 <i>Science Link</i> 385 <i>Writing Link</i> 388</p> <p>Student CD: <i>Extending Your Learning</i> Manufacturing Technologies, Robotics <i>Interactive Labs</i> Systems Model</p>
<p>4.3 Describe a manufacturing organization, e.g., corporate structure, research and development, production, marketing, quality control, distribution.</p>	<p>Student Edition: 30, 105-115</p> <p>Student CD: <i>Extending Your Learning</i> Manufacturing Technologies <i>Interactive Labs</i> The Designed World, The Seven Resources of Technology, Systems Model</p>
<p>4.4 Explain basic processes in manufacturing systems, e.g., cutting, shaping, assembling, joining, finishing, quality control, and safety.</p>	<p>Student Edition: 107-113, 119, 346-347 <i>Design, Build & Evaluate</i> 120-123 <i>Safety Alert</i> 78, 122, 394-397 <i>Science Link</i> 111</p> <p>Student CD: <i>Extending Your Learning</i> Manufacturing Technologies <i>Interactive Labs</i> Hand Tools, Primary Processes, Safety Data Sheets, Secondary Processes</p>
<p>5. Construction Technologies <i>Central Concept:</i> Construction technology involves building structures in order to contain, shelter, manufacture, transport, communicate, and provide recreation.</p>	
<p>5.1 Describe and explain parts of a structure, e.g., foundation, flooring, decking, wall, roofing systems.</p>	<p>Student Edition: 66-68, 74-75 <i>Design, Build & Evaluate</i> 38-39, 76-81 <i>Reading Link</i> 50</p> <p>Student CD: <i>Interactive Labs</i> Designed World, Forces on Structures</p>

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5.2 Identify and describe three major types of bridges (e.g., arch, beam, and suspension) and their appropriate uses (e.g., site, span, resources, and load).	Student Edition: 68-71 <i>Impact of Technology</i> 69 Student CD: <i>Interactive Labs</i> Forces on Structures
5.3 Explain how the forces of tension, compression, torsion, bending, and shear affect the performance of bridges.	Student Edition: 68-71 Student CD: <i>Interactive Labs</i> Forces on Structures
5.4 Describe and explain the effects of loads and structural shapes on bridges.	Student Edition: 68-71, 74-75 <i>Design, Build & Evaluate</i> 76-79 Student CD: <i>Interactive Labs</i> Forces on Structures
6. Transportation Technologies <i>Central Concept:</i> Transportation technologies are systems and devices that move goods and people from one place to another across or through land, air, water, or space.	
6.1 Identify and compare examples of transportation systems and devices that operate on or in each of the following: land, air, water, and space.	Student Edition: 153-167, 201-217, 222-223 <i>Design, Build & Evaluate</i> 218-219 <i>Impact of Technology</i> 167 <i>Reading Link</i> 203 <i>Science Link</i> 206 Student CD: <i>Extending Your Learning</i> Land and Water Transportation <i>Interactive Labs</i> Forces and Flight, Systems Model

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<p>6.2 Given a transportation problem, explain a possible solution using the universal systems model.</p>	<p>Student Edition: 129-131, 216-217 <i>Design, Build & Evaluate</i> 218-223 <i>Science Link</i> 206 <i>Writing Link</i> 166</p> <p>Student CD: <i>Extending Your Learning</i> Land and Water Transportation <i>Interactive Labs</i> Systems Model</p>
<p>6.3 Identify and describe three subsystems of a transportation vehicle or device, i.e., structural, propulsion, guidance, suspension, control, and support.</p>	<p>Student Edition: 156-165, 216-217 <i>Design, Build & Evaluate</i> 146-147, 168-173 <i>Math Link</i> 171</p> <p>Student CD: <i>Extending Your Learning</i> Air & Space Technologies, Hydraulics and Pneumatics <i>Interactive Labs</i> Forces and Flight, Internal Combustion Engines</p>
<p>6.4 Identify and explain lift, drag, friction, thrust, and gravity in a vehicle or device, e.g., cars, boats, airplanes, rockets.</p>	<p>Student Edition: 129-136, 153-167 <i>Design, Build & Evaluate</i> 146-147, 168-173 <i>Science Link</i> 158</p> <p>Student CD: <i>Extending Your Learning</i> Air & Space Technologies <i>Interactive Labs</i> Forces and Flight</p>

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<p>7. Bioengineering Technologies <i>Central Concept:</i> Bioengineering technologies explore the production of mechanical devices, products, biological substances, and organisms to improve health and/or contribute improvements to our daily lives.</p>	
<p>7.1 Explain examples of adaptive or assistive devices, e.g., prosthetic devices, wheelchairs, eyeglasses, grab bars, hearing aids, lifts, braces.</p>	<p>Student Edition: 404-408 <i>Design, Build & Evaluate</i> 414-419 <i>Impact of Technology</i> 407</p> <p>Student CD: <i>Extending Your Learning</i> Bioengineering <i>Interactive Labs</i> Cochlear Implants</p>
<p>7.2 Describe and explain adaptive and assistive bioengineered products, e.g., food, bio-fuels, irradiation, integrated pest management.</p>	<p>Student Edition: 403-412, 443-453 <i>Design, Build & Evaluate</i> 414-419, 456-459 <i>Impact of Technology</i> 407, 445 <i>Math Link</i> 446 <i>Reading Link</i> 453 <i>Science Link</i> 452 <i>Writing Link</i> 450</p> <p>Student CD: <i>Extending Your Learning</i> Bioengineering <i>Interactive Labs</i> Cochlear Implants</p>