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**Subject Area: Technology Education
Course: General Technology Education, Grades 9-12**

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General Technology Education


This course provides students with a comprehensive understanding of energy sources, the conversion of energy to provide power, and the use of power in the various transportation systems. Emphasis is placed on developing an understanding of the interrelationship of energy, power, and transportation systems, followed by research and development to discover new ways to satisfy human needs. Students will apply science comprehension, mathematics skills, and communication skills to conduct research and develop projects. Work-based learning strategies appropriate for this course include field trips, service learning, and job shadowing. This course and Technology Student Association technical and leadership activities enhance skills essential for students interested in technical and engineering career fields.


Prerequisite: None


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General Technology Education		Content Guideline									
Louisiana Technology Education Related Content Standards 		Introduction	Career Skills	Technology Student Association	General Safety	Basic Technical Drafting	Basic Electricity/Electronics	Basic Metal	Basic Woodworking	Materials & Processes	Energy, Power, and Transportation
* All benchmarks are not marked for all Technology Education courses.											
General Technology Education Standard: 1. Provide students with the opportunity to explore various technical careers through modular Technology Education activities.											
A. Discuss business ethics in the workplace.		712-714	712-714	712-714	151-153, 155, 293, 300, 309-310, 356, 358, 409, 523, 563, 712-714	712-714	151-153, 300, 666-668, 712-714	128-129, 151-153, 300, 309-310, 712-714	152-153, 712-714	153, 712-714	712-714
B. Design, draw, build, and assemble a balsa wood project using the teamwork concept.									272-275, 326-328, 342-343, 522	342-343, 522	
C. Perform basic operations of an MAC/PC microcomputer: word processing, graphics, database, and spreadsheet applications.						174, 396-399	396-399				
D. Compose and print various projects using graphic design computer software.						174, 221-222, 240-241, 396-399, 416-417, 438-440, 460-461	221-222, 240-241, 396-399, 416-417, 438-440, 460-461	221-222, 240-241, 396-399, 416-417, 438-440, 460-461	240-241	174, 221-222, 240-241, 396-399, 416-417, 438-440, 460-461	174

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E. Identify basic drawing instruments, acceptable lettering practices, and the alphabet of lines used in drafting and apply them to both basic and Computer Aided Drafting Design (CADD).						195-202, 205, 221-222, 226-230, 233-235, 240-241, 381, 670, 682	205, 232-233	64, 70-72, 157-161, 164-168, 171, 195-202, 226-231, 233-235, 306-307	36-37, 69, 82-84, 131-133, 136-138, 157-160, 164-168, 178-189, 195-202, 205, 225-231, 235, 306-311, 333-334	195-202, 205, 221-222, 226-230, 233-235, 240-241, 381	205
F. Develop an understanding of the need for a drug free life/work place.			N/A	N/A	N/A						
G. Demonstrate basic skills in electrical circuitry related to magnetism, AC/DC circuits, motors, voltage, current, resistance, power, and measurements.							69-72, 91-92, 108, 144-145, 158-160, 163, 277, 419-420, 517, 527-529				72, 74-75, 91-92, 108, 140-145, 285, 347, 419-420, 480-482, 514-515, 517, 527-529, 531-534,

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H. Discuss the common electronics components and circuits used today.						108, 111-114				
I. Explain the principles of flight and use videotape instruction and computer programs to design an airplane.										493-496, 505, 625
K. Explore the space program and the development of rocketry; build and launch a model rocket.										469, 498-502, 505
L. Discuss transportation systems and identify means of solving transportation problems.										95-98, 464-519, 718-719, 721
M. Identify careers related to the field of Computer Numerical Control.		312-314	312-314							
N. Gain knowledge and develop fundamental skills in assembling, operating, and testing basic hydraulic circuits.						558-559				
O. Explore the communication areas of fiber optics, laser, and microwave transmissions.						281-282, 361, 422-423, 429, 530				

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	Q. Identify, construct, and operate pneumatic circuits.									232-233, 558-559
R. Explore alternate energy sources of hydro-electric power, solar sterling, solar thermal, and wind power.						533-534, 540-545, 553-554				540-545, 553-554
S. Explore manufacturing industries, materials and how they are processed, and the production of goods to satisfy the demands of society.									38, 46-47, 69-72, 94, 99, 109-111, 169-170, 192, 246-317, 548, 641-644, 651, 654-665, 673, 684-686, 700-702, 708-709	N/A

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U. Prepare a student career portfolio.			18, 43, 48, 79, 103, 119, 130, 167, 180, 205, 223, 237, 252, 260, 289, 313, 325, 348, 371, 391, 402, 441, 456, 473, 502, 516, 534, 542, 580, 602, 631, 649, 670, 682, 705, 710-714, 719	221-222, 240-241, 342-343, 396-399, 416-417, 438-440, 460-461, 520-521, 590-591, 634-635							

General Technology Education Content Guideline

(The student will be able to . . .)

Unit One

Introduction to Technology Education

1. Summarize the course contents.
2. Identify and explain the state, parish, and local rules and regulations.

Unit Two

Career Skills

1. Explain how Technology Education provides a foundation for students to explore a multitude of career paths.
2. Explain and discuss work ethics and employer expectations in the technology industry.
3. Develop a resume.
4. Complete a sample job application.
5. Explain the importance of the job interview, as well as interview techniques.

Unit Three

Technology Students Association (TSA)

1. Demonstrate an interest in and an enthusiasm for learning about the technical world in which we live and work.
2. Demonstrate leadership abilities developed through TSA activities.
3. Demonstrate professionalism and high standards of workmanship.
4. Participate in a TSA competitive event.

Unit Four

General Safety

1. Explain and apply general lab safety rules.
2. Explain and apply safety rules for personal safety.
3. Explain and apply the safety rules for the use of tools and equipment.
4. Develop a safety poster.

Unit Five

Basic Technical Drafting

1. Identify and explain the major types of technical drafting and the various careers in the drafting occupations.
2. Demonstrate an appreciation for high standards of craftsmanship through competition.
3. Construct vertical or inclined, single-stroke gothic lettering, numerals, and fractions, including proper spacing and guidelines.
4. Select the proper drawing materials for specific types of drafting projects and name the various drafting instruments, equipment, and materials and describe the use of each.
5. Describe how sketching aids can be used for creative communication and sketch simple objects using correct line techniques.
6. Apply geometric construction to single-view and multi-view drawings, identify geometric terms and shapes, and draw lines, angles, circles, arcs, tangents, and polygons.
7. Identify fundamentals of orthographic projection, sketch orthographic views and scaled drawings, and prepare formal orthographic (multi-view) drawings.
8. Create and use symbols library, dimensioning practices, and set up and apply dimensioning techniques.
9. Convert an angular dimension of an orthographic to a linear dimension in a pictorial drawing and demonstrate the proper techniques in the drawing of various pictorial representations.
10. Produce a working drawing describing the purpose of each type of working drawing; draw title block, bill of materials, and schedules.

Unit Six

Basic Electricity/Electronics

1. Interpret emergency procedures, equipment failure procedures, appropriate precautionary action, appropriate types of fire extinguishers, personal safety practices, and safety factors for all electrical tools.
2. Explain how technology education offers a definite path for a student to follow, including job-seeking skills, job-seeking terminology, resources used, expectations of employees, and outline information essential to applying, evaluating, and terminating a job.
3. Perform arithmetic function of fractions, multiply and divide decimal numbers to the ten thousandths place; add, subtract, multiply, and divide numbers expressed in scientific notation; name unit prefixes, give their value, and convert from one unit prefix to another.
4. Understand basic building materials from which all matter is constructed, state and equate Ohm's Law, display awareness of electrical current and properties, develop a working knowledge of conductors and insulators, understand electrical power, and use the three power equations.

5. Practice interpreting the reading of all meters and scales, operate an amp meter and voltmeter using different functions, and identify safe use and care of meters.
6. Build practical circuits in order to test and confirm Kirchoff's Laws; state Kirchoff's Laws and uses in circuit analysis; name several types of capacitors and their construction, and analyze DC circuits containing them; determine branch currents and load resistor voltage drops in series, parallel, and series parallel circuits.
7. Describe the factors that determine inductance, classify magnets according to the method by which they obtain their magnetic field, and define induction, inductance, and counter EMF.

Unit Seven

Basic Metal

1. Identify the six different properties of metals, list and describe the four classifications of metals, identify different metals by use of one or more of the identification processes, and list different metals in each classification.
2. Understand concepts/skills (math, measurements, measuring devices) needed for basic metals and identify and describe the proper use of hand and power tools for basic metal.
3. Apply the principles of design in project drawing; scribe lines, arcs, circles, and angles accurately, and read a working drawing, and transport and use layout tools safely.
4. Differentiate natural and artificial abrasives.
5. Use various clamping devices, hand cutting tools, adjustable and nonadjustable wrenches, and screwdrivers safely.
6. Illustrate the different pattern-making developments and apply the safe use of hand tools, machines and equipment in performing all basic operations.
7. Summarize the types of heat-treating processes, illustrate the safe procedure for lighting a furnace, the basic hand forging techniques, and demonstrate safe use of all hand forging tools.
8. Illustrate and identify the types of patterns, terms and tools used in the foundry area, and demonstrate ability to light, adjust, and shut down furnaces.
9. Illustrate and identify welding equipment and accessories. Assemble and properly use the tools and equipment needed.
 - a. Safely light and properly adjust the torch.
 - b. Strike and maintain the arc with the proper arc length and electrode angle in all positions.

Unit Eight

Basic Woodworking

1. Distinguish between hardwoods and softwoods, determining relative cost vs. grade, and display a working knowledge of the characteristics and uses of various lumber.
2. Differentiate between proper and improper technique for using each tool safely, and make accurate English and metric measurements using fractional division and decimals.

3. Identify and select basic wood joints and organize an assembly plan using correct measurements.
4. Choose a project for construction based on needs, styling/period, and good design features and apply the Scientific Method of Problem Solving in planning the project, including the use of proper drawing techniques, a basic plan of procedure, and a bill of materials.
5. Identify and safely use hand and power tools used for shaping and squaring stock.
6. Determine size of nails and screws needed by diameter and properly install nails, screws, and other miscellaneous fasteners using the twist drill from pilot hole chart.
7. Prepare a wood surface for finishing and use preventive and corrective means of preparation for finishing during and after construction.
8. Prepare and apply appropriate finish/solvent for a given interior or exterior finishing task, demonstrating good safety skills and habits while working with finishing materials and supplies, and satisfactorily clean finishing supplies for later use.
9. Identify types and uses of portable power tools in basic woodworking and safely perform various cuts using freehand portable power tools with attachments and accessories.

Unit Nine

Materials and Processes

1. Explain the five (5) principal elements of the production system, methods and processes of research and development, and marketing.
2. Produce a management and marketing plan, and demonstrate an understanding of production.
3. Create a division of labor showing its advantages and disadvantages, why quality control is important to production systems, and how computers are used to increase productivity.
4. Describe the stages of materials, the uses of bark and the development of paper, and the procedure for measuring and cutting glass and composite materials.
5. Discuss extraction and refining practices; the physical and mechanical properties of metal; the unique characteristics of plastics, thermoplastics, and thermo sets; the development of natural and synthetic rubber; the importance of rock and stone in industrial cement, concrete, reinforcement, and in testing procedures.
6. Differentiate between textiles and fabrics; list various forest materials and two (2) classifications of wood; identify four (4) or more products made of clay; explain the need for forest conservation.
7. Explain and identify two (2) different processes of producing cellular plastic products.
8. Explain spinning, stamping, laminating, and types of separating processes.
9. Explain the reason for combining materials and substances; identify 3 classifications of finishing processes and give examples of each; provide examples of induced fracture, chip removal, thermal separation, and chemical and electrical separation.

Unit Ten

Energy Power and Transportation

1. Differentiate between kinesthetic, potential energy, renewable, and nonrenewable energy, and inexhaustible energy.
2. Explain power and describe six (6) energy/power terms and formulas to solve for each variable.
3. Identify and list six (6) simple machines, describe power generation, transformers, transmission lines, conductors, insulators, and semiconductors.
4. Recognize the function of each transmission component and the most common valves used in fluid power systems.
5. Describe the operation of a two-and four-stroke gasoline engine, the major systems in a single-cylinder engine, the five (5) types of internal combustion engines, and the importance of proper maintenance.
6. Explain the importance of wind power and the three (3) ways that solar heat can be transferred, solar orientation and its appreciation to solar heating, the principles of connection currents, and nuclear energy and its effect on the environment
7. Explain modes of transportation used to carry passengers and freight, and the impact of transportation on our lives.
8. Compare the different water transportation vehicles used to transport people and freight. Apply the concepts of drag, force, inertia, and water pressure by designing and building a lock, and speculate about the future of water transportation systems.
9. Describe several types of air transportation vehicles; speculate the importance of space transportation as a future mode of transportation of people and products; and recognize that pipelines, conveyors, and elevators are transportation forms.
10. Create, research, and develop a future space transportation system and prepare a speech for the TSA public speaking contest.

Resources

Technology: Today and Tomorrow. (1999). Glencoe Macmillan McGraw-Hill.

Goodheart-Wilcox Company, Inc. (2000).

American Technical Publishers, Inc. (2000).