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Subject: Technology Education I & II

CISD Curriculum Framework – Scope

Local Objectives	Extension	Textbook	Time Range	Assessment	Resources
<p>Unit 1 3d Modeling (Section 1) Upon successful completion of this module, the student will be able to:</p> <ul style="list-style-type: none"> • Demonstrate an understanding of what three-dimensional modeling is, and how it is used • Describe various career options available in the field of computer modeling • Open and edit graphic files • Describe objects in terms of three-dimensional space • Combine three-dimensional images into a complex model • Create an animated 3D sequence • Recognize the use of 3D imaging as special effects in television and media 	Module Challenges	Technology	10-15 days	Student Notes Workbook Module Post-Test	
<p>3D Modeling (Section 2) Upon successful completion of this module, the student will be able to:</p> <ul style="list-style-type: none"> • Demonstrate an understanding of what three-dimensional modeling is and how it is used 	Module Challenges	Technology	10-15 days	Student Notes Workbook Module Post-Test	

Local Objectives	Extension	Textbook	Time Range	Assessment	Resources
<p>Unit 2 Animation</p> <p>Upon successful completion of this module, the student will be able to:</p> <ul style="list-style-type: none"> • Create simple and complex animated graphics • Describe the history of animation, the expanding role that animation plays in today’s movies, videos and cartoons and produce an animation • Use computer software to create paths, backgrounds and animated texts • Create a storyboard to map out an animated movie • Use computer software to create cartoon characters, people and animals • Produce a short topic video using advanced animation techniques • Pursue independent study in the field of animation 	Module Challenges	Technology	10-15 days	Student Notes Workbook Module Post-Test	Animation Works
<p>Unit 3 Artificial Intelligence</p> <p>Upon successful completion of this module, the student will be able to:</p> <ul style="list-style-type: none"> • Describe the history, terminology and present day applications of artificial intelligence • Explore expert systems, natural language, machine learning, neural nets and fuzzy logic 	Module Challenges	Technology	10-15 days	Student Notes Workbook Module Post-Test	Family Entertainment Game Pak with Mind-Games, Visual Expert and Artificial Intelligence, Whiskers programmable artificial intelligence robot and Mind Tools book

Local Objectives	Extension	Textbook	Time Range	Assessment	Resources
<ul style="list-style-type: none"> • Analyze and examine the nature of thought and thinking, compare and contrast the human brain with a computer, and the relationships among science fiction, robots and artificial intelligence • Program and operate an artificial intelligence robot • Construct an expert system • Explore the future of artificial intelligence research and applications <p>Unit 4 Automation and Robotics Upon successful completion of this module, the student will be able to:</p> <ul style="list-style-type: none"> • Describe the automatic operation and control of equipment use in the process • Perform automatic operation by becoming familiar with the basic parts of a robot and analyze how robots make the manufacturing process easier and safer • Describe career options available in the fields of automation and robotics • Write and execute programs for a robotic arm for single and double operations, and assess the results • Experiment with a succession of commands to perform specific operations with a robot 	Module Challenges	Technology	10-15 days	Student Notes Workbook Module Post Test	Lab-Volt Armdroid 1000, Teach pendant, rotary carousel, gravity feeder, Armdroid 1000 Interface, Level 2 Robotics Software

Local Objectives	Extension	Textbook	Time Range	Assessment	Resources
<p>Unit 5 Computer-Aided Design (CAD) Upon successful completion of this module, the student will be able to:</p> <ul style="list-style-type: none"> • Demonstrate an understanding about axes, grids, and coordinates; draw basic shapes and text; create various line types; dimension a drawing; add borders and titles, and plot drawings • Describe various career options available in the field of CAD • Produce basic and advanced drawings and configurations on the computer using CAD software • Use a plotter to output a design created on the computer • Use CAD software to design a furnished house • Use CAD software to design a hot rod 	Module Challenges	Technology	10-15 days	Student Notes Workbook Module Post Test	Autosketch for Windows software, laser printer, drafting kid, instructional video segments from What is CAD?
<p>Unit 6 Computer Graphic Design Upon successful completion of this module, the student will be able to:</p> <ul style="list-style-type: none"> • Discuss the early stages of graphics and it's development up to the present era of computer graphics • Identify the industrial applications of computer graphics • Use basic tools used by a graphic artist 	Module Challenges	Technology	10-15 days	Student Notes Workbook Module Post test	Laser printer, industrial grade heat transfer machine, Canvas for Windows

Local Objectives	Extension	Textbook	Time Range	Assessment	Resources
<ul style="list-style-type: none"> • Describe various career options available in the field of computer graphic design • Use computer software to create shapes and text and add colors, patterns, special effects and textures • Design a graphic with shapes and text, print it, and transfer the image onto a T-shirt • Use complex graphic design principles and the computer to design and produce a suitable logo and business stationery for a company <p>Unit 7 CNC: Lathe</p> <p>Upon successful completion of this module, the student will be able to:</p> <ul style="list-style-type: none"> • Operate a computer numerical control (CNC) lathing machine • Determine how to specify dimensions and manufacture parts in a series of activities • Describe various career options available in the field of computer numerical control • Use computer software to program a lathe • Follow instructions to safely set up, operate and run a lathe to create a finished machine part • Design and create a complex part according to specifications 	Module Challenges	Technology	10-15 days	Student Notes Workbook Module Post test	Lab-Volt Automation 5300 CNC Lathe, Lab-Volt Automation Level 4 Windows based Lathe software, indexable carbide inserts, 6 HSS cutting tools, safety equipment

Local Objectives	Extension	Textbook	Time Range	Assessment	Resources
<ul style="list-style-type: none"> • Apply advanced applications of CNC lathe technology to design and prepare documentation to replicate an item <p>Unit 8 CNC: Mill</p> <p>Upon successful completion of this module, the student will be able to:</p> <ul style="list-style-type: none"> • Operate a computer numerical control (CNC) milling machine • Determine how to specify dimensions and manufacture parts in a series of activities • Describe various career options available in the field of computer numerical control • Follow instructions to safely operate a mill and use computer software to program a mill • Write a Part program and use industry-standard G and M operations • Set up the mill and use the drilling cycle command to mill a shoulder and a pocket and drill holes on a workpiece 	Module Challenges	Technology	10-15 days	Student Notes Workbook Module Post test	Lab-Volt Automation 5400 CNC Mill, Lab-Volt Automation Level 4 Windows-based Mill Software, milling vise, tool package, safety glasses

Local Objectives	Extension	Textbook	Time Range	Assessment	Resources
<p>Unit 9 Desktop Publishing Upon successful completion of this module, the student will be able to:</p> <ul style="list-style-type: none"> • Create original documents on a desktop publishing system and be familiar with principles such as layout, page design, and typography • Describe various career options available in the field of desktop publishing • Design and produce a document that meets specific requirements • Write and design original documents in desktop publishing software, applying styles, sizes, and colors to text • Scan images and import them into a document • Create a poster and an advertisement that appropriately combine art with typography 	Module Challenges	Technology	10-15 days	Student Notes Workbook Module Post test	QuarkXPress for Windows, scanner, Laser Jet Printer
<p>Unit 10 Engineering and Stress Analysis Upon successful completion of this module, the student will be able to:</p> <ul style="list-style-type: none"> • Demonstrate the concepts of equilibrium, stress, strain, and deflection, Hooke's Law, tension and compression, elongation and shortening, shear and torsion, beam bending and deflection, 	Module Challenges	Technology	10-15 days	Student Notes Workbook Module Post tests	Stress Analyzer, Structural Analysis software, Instructional video segments for 'Build'em' and 'Bust'em'

Local Objectives	Extension	Textbook	Time Range	Assessment	Resources
<p>fatigue and buckling, and the Finite Element Method (FEM) as applied to the construction of buildings and bridges</p> <ul style="list-style-type: none"> • Demonstrate an understanding of the principles of size, shape, strength, and deflection of construction beams under load • Test the stress and deflection of a structure using a stress analyzer • Design, construct, and test the efficiency of a balsa wood structure <p>Unit 11 Exploratory Electronics</p> <p>Upon successful completion of this module, the student will be able to:</p> <ul style="list-style-type: none"> • Demonstrate the concepts of current, voltage, and resistance, conductors and insulators, series circuits, parallel circuits, Ohm's Law, series-parallel circuits, three way switches, magnetism, and electromagnetism • Demonstrate the ability to safely handle electronic circuitry in performing a variety of tasks along with the ability to use calculated values to predict electrical circuit performance • Describe various career options available in electronics • Perform experiments and use measuring devices to demonstrate 	<p>Module Challenges</p>	<p>Technology</p>	<p>10-15 days</p>	<p>Student Notes Workbook Module Post test</p>	<p>Lab-Volt Exploring Electronics trainer, experimental circuits, transistors, switches, resistors, capacitors, magnets, coils, lamps and solar cells, voltmeter, ammeter, Electrical Principles and Electrical Circuits video</p>

Local Objectives	Extension	Textbook	Time Range	Assessment	Resources
<p>and test electrical circuitry</p> <ul style="list-style-type: none"> • Apply knowledge learned in the module to troubleshoot electrical currents • Troubleshoot and repair faulted electrical and electronic systems <p>Unit 12 Flight Instrumentation</p> <p>Upon successful completion of this module, the student will be able to:</p> <ul style="list-style-type: none"> • Fly an airplane by relying on the instrumentation in the cockpit of the airplane • Demonstrate an understanding of instrument scan technique used by professional pilots and practice it when using the simulator console and software package • Explore basic theories of flight and aerodynamics and study radio navigation using VOR (very high frequency omnirange) • Describe various career options available in the aviation industry • Locate and explain the flight instruments and execute basic instrument flight maneuvers • Simulate flight using flight controls • perform advanced and emergency flight procedures 	<p>Module Challenges</p>	<p>Technology</p>	<p>10-15 days</p>	<p>Student Notes Workbook Module Post tests</p>	<p>Simulator control console, yoke, rudder, pedals, FS-200 Flight Console software, Let's Go Flying and Instrumentation Fundamentals</p>

Local Objectives	Extension	Textbook	Time Range	Assessment	Resources
<ul style="list-style-type: none"> • Demonstrate advanced flying skills, including advanced planning and plotting of a course, take-off, simulated flying, communicating, and landing, and perform advanced emergency flight procedures <p>Unit 13 Flight Simulation</p> <p>Upon successful completion of this module, the student will be able to:</p> <ul style="list-style-type: none"> • Describe the internal and external parts of an airplane, including the instrument panel • Practice many different maneuvers in the flight simulator • Describe four forces that act on an airplane, jet engines, pilot licensing. • Locate and explain the flight instruments and execute basic instrument flight maneuvers • Simulate a flight using flight controls • Demonstrate advanced flying skills, including advanced planning and plotting of a course, take-off, simulated flying, communicating, and landing • Describe various career options available in the aviation industry 	Module Challenges	Technology	10-15 days	Student Notes Workbook Module Post test	Yoke system, rudder, pedals, Flight Simulation software, Let's Go Flying video

Local Objectives	Extension	Textbook	Time Range	Assessment	Resources
<p>Unit 14 Plastics Upon successful completion of this module, the student will be able to:</p> <ul style="list-style-type: none"> • Demonstrate an understanding of the history, modern day uses, chemical properties, types and manufacturing processes of plastics • Use an injection molding machine to produce plastic parts • Understand polymers and the polymerization process and analyze and evaluate environmental issues relating to the manufacture, use and future of plastics • Use a plastic vacuum forming machine to create a sign • Use an injection molding machine to produce plastic parts • Use a chemistry kit to determine the composition of an element and to observe chemical properties 	Module Challenges	Technology	10-15 days	Student Notes Workbook Module Post test	Vacuum forming machine, injection molding machine, chemistry kit, tools, molds, heat-resistant gloves, hot pad, vacuum molds, injection molds, Table of Elements
<p>Unit 15 Video Production and Digital Video Editing Upon successful completion of this module, the student will be able to:</p> <ul style="list-style-type: none"> • Demonstrate the proper care, handling, and operation of video equipment along with techniques to plan, light, and shoot a video, 	Module Challenges	Technology	10-15 days	Student Notes Workbook Module Post test	Video capture board, Adobe Premiere software, video camera, studio lights and stands, video monitor, VCR

Local Objectives	Extension	Textbook	Time Range	Assessment	Resources
<p>then create advanced special effects, narration, and titling to prepare a complete video presentation</p> <ul style="list-style-type: none"> • Use video equipment and techniques to produce, shoot, and critique a talk show • Use advanced lighting, audio, and taping techniques to create a video production • Use video editing techniques to add audio to video • Use an edit worksheet to keep track of dramatic sequences and shots to be edited and edit a video • Use video editing equipment and techniques to create advanced special effects, narration and titling <p>Unit 16 (CJHS Only) Computer Problem Solving Upon successful completion of this module, the student will be able to:</p> <ul style="list-style-type: none"> • Identify the various methods of problem-solving: the trial and error strategy, the proximity method, the break-problems-into-parts method, and the use-prior-knowledge method • Develop strategies for solving simple and complex problems using deductive and critical thinking skills, and experiment with the steps 	<p>Module Challenges</p>	<p>Technology</p>	<p>10-15 days</p>	<p>Student Notes Workbook Module Post test</p>	<p>Mind-bending software and books, Lost Mind of Dr. Brain, Think Ahead, The Even More Incredible Machine, Zoop</p>

Local Objectives	Extension	Textbook	Time Range	Assessment	Resources
<p>involved in arriving at the solution</p> <ul style="list-style-type: none"> • Describe various careers that require problem-solving strategies • Use simulation models and challenging games to solve a variety of conceptual and spatial problems • Use existing knowledge to solve problems • Use modeling as a method of solving problems • Test and evaluate a solution <p>Unit 17 (CJHS Only) Alternative Energy Upon successful completion of this module, the student will be able to:</p> <ul style="list-style-type: none"> • Understand terminology and concepts underlying alternative energy research and development • Explore renewable and nonrenewable energy sources, energy conversion systems, wind and solar energy forms • Understand the environmental issues of modern society by analyzing and evaluating the environmental benefits and challenges posed by alternative energy sources • Use the Alternative Energy trainer to conduct experiments and demonstrations in alternative energy • Use the Alternative Energy trainer to demonstrate active solar energy 	Module Challenges	Technology	10-15 days	Student Notes Workbook Module Post test	Lab-Volt Alternative Energy trainer, solar oven, solar panel, electroscope assemblies, lights and adapters, wind turbine, pulley belts, fan box, sun lamp and tools

Local Objectives	Extension	Textbook	Time Range	Assessment	Resources
<ul style="list-style-type: none"> • Use a solar oven to collect, concentrate, and convert sunlight into usable energy • Use the Alternative Energy trainer and the wind turbine to demonstrate wind energy Use a solar oven to collect, concentrate, and convert sunlight into usable energy • Use the Alternative Energy trainer and the wind turbine to demonstrate wind energy <p>Unit 18 (CJHS Only) Aerodynamics Upon successful completion of this module, the student will be able to:</p> <ul style="list-style-type: none"> • Demonstrate an understanding of how temperature, pressure and humidity affect the four aerodynamic forces (weight, lift, drag, and gravity) • Understand Bernoulli’s Principle, angle of attack, helicopters, mass flow, lever law, stability and control, viscosity, airfoil theory and supersonics • Use a wind tunnel to test a variety of airfoils • Describe various careers options in the field of aerodynamics • Collect and measure atmospheric data • Learn how to safely operate a wind tunnel • Perform experiments to 	Module Challenges	Technology	10-15 days	Student Notes Workbook Module Post test	Tech-Design wind tunnel, weather center, calibration kit, Fundamentals of Aeronautics Technology and Let’s Go Flying videos

Local Objectives	Extension	Textbook	Time Range	Assessment	Resources
<p>demonstrate the motion of an airfoil in a wind tunnel</p> <ul style="list-style-type: none"> • Design an airfoil that demonstrates optimal standards of drag, lift and velocity • Apply advanced principles of aerodynamic standards <p>Unit 19 (CMS only) Manufacturing Processes Upon successful completion of this module, the student will be able to:</p> <ul style="list-style-type: none"> • Explore the processes involved in modern-day manufacturing systems and understand the steps involved in the assembly and material handling processes • Understand the varying types of sensors used in the manufacturing process, including inductive, capacitive, and fiber optic sensors • Analyze and understand a control routine that controls the moving, sorting, positioning, assembly, testing and inventorying of a product • Develop a ladder logic diagram program to complete the assembly and testing of a product • Use the Manufacturing Processes trainer to sort and assemble components, and then check for correct assembly 	Module Challenges	Technology	10-15 days	Student Notes Workbook Module Post test	Manufacturing Processes trainer, industrial sensors and actuators, Ladder Logic Design and Simulation software

Local Objectives	Extension	Textbook	Time Range	Assessment	Resources
<p>Unit 20 (CMS Only) Weather Satellite Upon successful completion of this module, the student will be able to:</p> <ul style="list-style-type: none"> • Interpret different types of satellites used in weather forecasting, read and interpret weather maps and distinguish between the various types of winds • Understand dewpoint, barometric pressure, Earth’s atmosphere, pressure systems, weather fronts and storm tracking • Describe various careers options available in weather-related fields • Operate and receive information on a ground-based weather station • Read and interpret weather maps and make a 24-hour local forecast • Capture and interpret weather satellite and regional station information • Prepare local and national weather forecasts 	Module Challenges	Technology	10-15 days	Student Notes Workbook Module Post test	Weather monitor, receiver with anemometer, barometric pressure sensors, GEOS C Package and Weatherlink Windows software, Weather Book, temperature and humidity sensors, A/B switch box, Weather Systems, Volume 6
<p>Unit 21 (CMS only) Fiber Optics and Lasers Upon successful completion of this module, the student will be able to</p> <ul style="list-style-type: none"> • Understand how codes, data, voice, radio and light are transmitted through optical fibers • Understand concepts of optical repeaters, sensor applications, attenuation, bending losses,: 	Module Challenges	Technology	10-15 days	Student Notes Workbook Module Post test	Fiber optic trainers, electrical power supply, audio interface leads, fiber optic cables, AM/FM radio, laser education kit, Fundamentals of Laser Technology and Fiber Optics Explained videos

Local Objectives	Extension	Textbook	Time Range	Assessment	Resources
<p>optical coupling, and optical terminations</p> <ul style="list-style-type: none"> • Understand characteristics and applications of laser light in modern technology • Describe various careers options available in fiber optics and laser technology • Perform experiments that demonstrate the principles of fiber optics • Generate communication techniques through the use of fiber optic cable • Demonstrate advanced communication techniques through fiber optics • Design an experiment in the application of fiber optics technology <p>Unit 22 (CMS Only) Exploring Electricity Upon successful completion of this module, the student will be able to:</p> <ul style="list-style-type: none"> • Understand and apply the concepts of series circuits, parallel circuits, series/parallel logic, the three-way switch, volts, amperes and ohms, Ohm's Law, Voltage Divider Law, Current Divider Law, and electromechanical switches. • Describe various careers options available in electrical science • Build a variety of circuits using 	<p>Module Challenges</p>	<p>Technology</p>	<p>10-15 days</p>	<p>Student Notes Workbook Module Post test</p>	<p>Exploring Electricity trainer, 12-Volt DC power supply, digital multimeter, electric relay, and a variety of lamps, switches and resistors</p>

Local Objectives	Extension	Textbook	Time Range	Assessment	Resources
<p>electrical leads</p> <ul style="list-style-type: none"> • Measure circuit characteristics with the digital multimeter <p>Unit 23 (CMS Only) Electronic Music Upon successful completion of this module, the student will be able to:</p> <ul style="list-style-type: none"> • Use sophisticated computer software, synthesizer, and interface devices as guides • Explore the capabilities of the computer to transform sounds and music and to save, recall, and output compositions • Demonstrate the multi-tracking technique and the versatility of the synthesizer to compose a simple, initial work • Compose and record a piece of music • Create sound effects that correspond to a narrative text • Use editing and other features offered in the sequencing software • Write and add sound effects to a narrative 	<p>Module Challenges</p>	<p>Technology</p>	<p>10-15 days</p>	<p>Student Notes Workbook Module Post test</p>	<p>Synthesizer, portable audio cassette recorder and tapes, speaker and MIDI Translator Interface card, Master Track Pro software, An Overview of Electronic Musical Instruments video</p>