

**INDUSTRIAL TECHNOLOGY**  
**MODULAR LABORATORY**  
Grade 7<sup>th</sup> & 8<sup>th</sup>

Below is a list of the modules that are in the technology laboratory.

**RESIDENTIAL PLUMBING**

**OBJECTIVE AND DESCRIPTION OF MODULE**

This module is an introduction to residential plumbing. The students read the introductory material and learn all about plumbing basics, starting with a brief history, and then a description of a residential water supply and DWV system. They learn all about the basic techniques used for installing and maintaining some of the most common plumbing fixtures.

The students also learn how to measure, cut, and dry-fit PVC and CPVC pipe for a DWV and water supply system. They install a kitchen faucet, sink strainer assembly, shower faucets with showerhead and tub spout, a tub drain/overflow assembly, and a hose bib.

There is no distinction between the lessons the students complete when using this module in a Level 1 or Level 2 format. Since each lesson builds upon the objectives completed in the previous lessons, students should complete Lessons 1-10 successively.

To use this module in conjunction with Level 2IS, students complete lessons 1-10, and one of the independent study projects listed in the Module Guide.

Career information is also found in the Module Guide

Residential Plumbing is a subset of the Construction Technology System.

**Residential Wiring**

**OBJECTIVE AND DESCRIPTION OF MODULE**

This module is an introduction to residential electrical wiring. Students learn about the many factors and considerations of wiring new circuits in the home. Topics such as safety, wiring techniques, wire gauge selection, coaxial cables, telephone wire, service panels, circuit breakers, and the National Electrical Code are discussed.

Students begin by learning the basic elements of the home electrical system. They learn about service panels, circuit breakers, grounding, safety, and how to identify different types of cables and wires. The National Electrical Code is also discussed. Students learn how to wire some of the more common circuits, ranging from simple to complex. This

includes how to wire a subpanel. They also learn about the importance of safety and the procedure that must be followed before working on any circuit. Two additional lessons are included where the students learn how to install a connector on a coaxial cable and how to connect telephone wire to the back of a modular CATV/phone jack

To use this module in conjunction with Level 1, students will stay in this module for approximately 14 days. Students complete the 10 lessons plus at least one independent study project.

To use this module in conjunction with Level 2, students complete Lessons 1-10.

To use this module in conjunction with Level 2IS, students complete lessons 1-10, and one of the independent study projects listed in the Module Guide.

Career information is also found in the Module Guide.

Residential Wiring is a subset of the Construction Technology System.

## **Introduction to Technology**

### **OBJECTIVE AND DESCRIPTION OF MODULE**

Introduction to Technology is a 5-lesson module. In this module, students will develop technological literacy by developing an understanding of the nature of technology and how to appropriately use technological processes. Students will explore the universal processes, knowledge, and contexts of technology. The students will also be introduced to the design process and solve technological problems by following the steps identified in the process.

## **Computer Problem Solving**

### **OBJECTIVE AND DESCRIPTION OF MODULE**

The purpose of this module is to teach the student problem solving strategies and deductive reasoning skills.

This module will teach the student different problem solving strategies, including the trial and error strategy, the proximity method, breaking the problem into parts strategy, and using knowledge to solve problems strategy. The student will also learn how to apply these strategies to develop solutions to problems. They will apply the problem-solving strategies to play logic games, both on and off the computer.

The student will also learn how technological problems are solved, what a problem statement is, and how to write a design brief.

Computer Problem Solving is a subset of the Communication Technology System.

## **Computer Graphic Design**

### **OBJECTIVE AND DESCRIPTION OF MODULE**

The purpose of this module is to introduce students to the basics of computer graphic design. They study the history of graphics and computer graphics and learn how to create their own computer graphics.

Students develop their understanding of computer graphic design by using the software package *Canvas*<sup>TM</sup>. They learn a variety of tools in *Canvas* to create their own graphics using different shapes, textures, and styles. As a final project, they transfer their computer graphics onto a T-shirt. In Levels 2 and 2 with Independent Study, students also design and create their own stationery. They also examine career opportunities in the area of computer graphic design.

Computer graphics is a subset of the Communication Technology System

## **Web Page Development**

### **OBJECTIVE AND DESCRIPTION OF MODULE**

The purpose of this module is to introduce students to the process of creating web pages through the use of Hypertext Markup Language (HTML) and web development software. They will learn the necessary tools in the provided software package to create their own web pages.

Students begin by studying web navigation and the history of web design. They then learn how HTML code is used to develop attractive and usable web pages and how *FrontPage* simplifies the process.

Web Development is a subset of the Communication Technology System.

## **Computer Animation**

### **OBJECTIVE AND DESCRIPTION OF MODULE**

The purpose of this module is to introduce students to the process of creating animation through the use of computers. They will learn the necessary tools in the provided software package to create their own animated films.

Students begin by studying the history of animation. They can then understand how useful the computer has been in alleviating some of the more cumbersome stages of creating animation by hand.

Animation is a subset of the Communication Technology System.

## **Fiber-Optics**

### **OBJECTIVE AND DESCRIPTION OF MODULE**

Fiber Optics and Lasers introduces the students to the principles of fiber optics and laser technology. The students use the Fiber Optics and Lasers Trainer to perform experiments and demonstrate basic fiber-optic and lasers communication.

Fiber Optics and Lasers is a subset of the Communication Technology System.

## **Digital Photography**

### **OBJECTIVE AND DESCRIPTION OF MODULE**

The introduction of digital cameras has caused the photographic process to become fast, functional and fun. In this module students take advantage of digital photography properties, such as instant viewing and editing capabilities, to acquire skills necessary to become a photographer in today's job market. An exploration of image enhancement software, along with a thorough explanation of computer camera controls, helps the photos taken by the student come to life on the computer monitor. Students are encouraged to apply and practice their newly developed skills by taking many pictures and creatively altering them through the use of image enhancement software.

Digital Photography is a subset of the Communication Technology System.

## **Computer-Aided Design**

### **OBJECTIVE AND DESCRIPTION OF MODULE**

Computer-Aided Design teaches students the basics of computer-aided design (CAD) using the software package, *AutoCad*<sup>®</sup>. Students are introduced to how products are developed using CAD technology, and they learn the basic tools needed to create two-dimensional drawings by using the software.

Computer-Aided Design is a subset of the Communication Technology System.

## **Electronics**

### **OBJECTIVE AND DESCRIPTION OF MODULE**

The Exploratory Electronics module provides experiments that help students understand the technology and scientific principles at work in computers, automobiles, and countless other innovations. As students learn about circuitry and develop skills in testing and troubleshooting, they also may discover an interest in electronics careers.

The module begins with the fundamental theories of electricity and electronics. These concepts include current, voltage, resistance, Ohm's law, and magnetism. Students also learn how to safely perform tasks with electronic circuitry.

As students progress through the module, they acquire more advanced knowledge and skills. For example, they learn to perform calculations and use these values to predict the performance of electrical circuits. They also develop the ability to troubleshoot and repair various faults in electrical and electronic systems.

Electronics is a subset of the Communication Technology System.

## **Flight Simulation**

### **OBJECTIVE AND DESCRIPTION OF MODULE**

The Flight Simulation module offers the students a realistic, professional pilot training experience. Students learn about aviation technology and the knowledge and skills required for a safe flight. They apply what they learn to virtual flying experiences, which may spark an interest in aviation-related continuing education and careers.

Students gain similar learning experiences in the Flight Simulation module. However, this module teaches flight without use of the instrument panel. With the simulation software, students test their virtual skill in taxiing, straight and level flight, and solo flying, as well as the skills covered in the Flight Instrumentation module. In addition, Flight Simulation students construct gliders and apply the principles of aerodynamics to understand how airplanes are able to fly. They also study the basic characteristics of jet engines and use the jet flight simulator to learn how to handle stall, uncoordinated flight, and slip.

Flight Simulation is a subset of the Transportation Technology System.

## **CNC Mill**

### **OBJECTIVE AND DESCRIPTION OF MODULE**

The CNC (computer numerical control) mill module features industrial-grade equipment to demonstrate how this equipment makes manufacturing more productive, efficient and safe. Students learn how to program and operate the mill and, as a result, may develop an interest in related occupations.

Students learn to program the mill with CNC software and to safely operate this equipment. With these fundamental skills and knowledge, students are then able to use modern techniques to design and manufacture objects.

During the module, students write a PART program and use industry-standard G and M codes. They use the drilling cycle command to mill shoulders and pockets and drill holes on work pieces. In later segments of the module, students design objects and prepare documentation to instruct users to replicate these items.

CNC mill is a subset of the Manufacturing Technology System.

## **CO2 Race Car**

### **OBJECTIVE AND DESCRIPTION OF MODULE**

The purpose of this module is to teach the student about the manufacturing process and the many steps necessary to manufacture an item. The student will learn about the manufacturing process as it relates to all the inputs, processes, and outputs associated with the design, development, production, and sale of a product. The student will apply several steps in the manufacturing process to design, custom manufacture, and test a CO<sub>2</sub> powered model car to demonstrate their understanding of the manufacturing process.

CO<sub>2</sub> Raceway is a subset of the Manufacturing Technology System.

## **Robotics**

### **OBJECTIVE AND DESCRIPTION OF MODULE**

In the Automation and Robotics module, students study the growing impact robotics has on industry and our lives. Through hands-on experiences, they program and operate a robot and add peripherals.

First, students identify the components of a robot and the types of industrial tasks that can be achieved more safely and easily through automation. Then, they write and execute programs for a robotic arm to perform both single and double operations.

Through other hands-on activities, students further explore the mechanics and functions of automation and robotics. They also learn how to program a series of commands for a robot to perform specific operations. Students also learn about advanced-education and career opportunities that are available for those with a strong interest in this area of technology.

Robotics is a subset of the Manufacturing Technology System.

## **Health and Fitness**

### **OBJECTIVE AND DESCRIPTION OF MODULE**

The Health module introduces students to technologies, including fitness equipment and medical treatments, that help improve our health. It emphasizes the importance of nutrition, hygiene, and physical and mental fitness. After completing this module, students may decide to continue learning for their personal benefit and possibly for health-related careers.

This module increases students' awareness of how technological innovations can help improve our health. For example, students try out an exercise bike and its self-monitoring devices. They also use a digital thermometer, calorie counter, and breath volume kit in various learning activities.

This module emphasizes the importance of healthy eating and exercise habits, proper hygiene, relaxation, and mental health. The hands-on experiences demonstrate how our health-related practices affect each major system in our bodies.

Health and Fitness is a subset of the Communication Technology System.

## **WOOD PRODUCTION (8<sup>th</sup> Grade)**

### **OBJECTIVE AND DESCRIPTION** *(in production lab)*

The purpose of this program is to provide students with a foundation of knowledge and technically orientated experiences in the study of wood production technology. This program focuses on transferable skills and stresses the understanding and demonstration of technical tools, machines, instruments, materials, processes and systems in business and industry.

The content includes, but is not limited to, a study of tools, materials, process and technical skills of production technology. The content and activities will also include the study of safety.