

# 7<sup>th</sup> and 8<sup>th</sup> grade Industrial Technology Curriculum

## Philosophy

Technology education is a vital link in the general educational experience of all students. It provides all students to actively participate in quality experiences, that incorporate technical, academic, problem solving and basic skills which will enable each student to adapt to an ever-changing world. Technologically literate student with problem solving and manipulative skills will enter the employment market with qualities that will enhance their success. Technology education is open to all students in the Watertown School District.

## Course Description

Students will be working with a partner on student directed modules, giving students control of their own learning experience. The experiences they share promote communication, teamwork, inquiry, learning, and social skills.

Modules are delivered through a combination of hands-on activities and multimedia curriculum. Math, science, technology, and language arts experiences are woven throughout each of the module's seven sessions. Equipment, materials, reference texts, and all supplies necessary to achieve success reside at the module workstation.

Every student's unique learning style is accommodated in the module's curriculum, whether a student is a kinesthetic or visual learner, a nonreader, or a speaker of English as a second language. The modules ensure student success through a combination of text, graphics, video, and hands-on activities.

# **Module: Alternative Energy**

## **Overview**

Students explore the basic concepts of energy, as well as the law of conservation of energy. Information is presented about renewable and nonrenewable energy sources and how these resource types are important for meeting global energy demands. The advantages and disadvantages of alternative energy forms such as solar, wind, biomass, geothermal, and hydropower are presented. Hands-on experiences include experiments with a wind turbine, solar cells, hydrogen fuel cell, and building a solar-powered model car.

## **Essential Questions:**

1. What are the characteristics of renewable and nonrenewable energy resources?
2. What is the scientific law of conservation of energy?
3. How is wind energy used for the production of electricity?
4. Why is the Sun an important role in the production of energy on Earth?

## **Content Standards:**

1. Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.
2. Students will develop an understanding of the effects of technology on the environment.
3. Students will develop the abilities to use and maintain technological products and systems.
4. Students will develop an understanding of and be able to select and use energy and power technologies.

## **Activities:**

1. Energy – investigate various energy resources and their classifications.
2. Solar Energy – name characteristics of solar energy and explain how a solar cell works.
3. Fuel Cell Energy – understands and explains how fuel cell technology functions.

## **Assessments:**

1. Pre test
2. RCA questions
3. Teacher assessment questions
4. Activities
5. Participation
6. Attendance
7. Post test

# **Module: Audio Broadcasting**

## **Overview:**

Students experience the important medium of radio and produce a radio broadcast. Students learn how to use a digital audio editing software program, record several announcements and stories, and assemble the recorded pieces into a sample broadcast. Students also learn about radio waves and how sound is sent from the station to people's radios in their homes and automobiles miles away.

## **Essential Questions:**

1. Why are the different types of radio stations and formats?
2. What is the role of advertising in radio?
3. What is the correct process for writing and recording a newscast introduction?
4. Why are music lead-ins and lead-outs for a radio broadcast created?

## **Content Standards:**

1. Students will develop an understanding of the cultural, social, economic, and political effects of technology.
2. Students will develop an understanding of the role of society in the development and use of technology.
3. Students will develop the abilities to apply the design process.
4. Students will develop an understanding of and be able to select and use information and communication technologies.

## **Activities:**

1. Making Commercials – explain and complete the processes used to record a radio commercial.
2. News Stories – explain the difference between news and commentary and classify types of news stories.
3. Final Broadcast – explain the importance of a carefully planned and practiced broadcast program and successfully create a CD of the final broadcast.

## **Assessments:**

1. Pre test
2. RCA questions
3. Teacher assessment questions
4. Activities
5. Participation
6. Attendance
7. Post test

## **Module: CADD**

### **Overview:**

Students use computer-aided drafting, or CAD, software to explore the fundamentals of drafting. Students use CAD software to create multi view drawings of a geometric solid and to complete a set of floor plans. The floor plans are based on standards for architectural drawings.

### **Essential Questions:**

1. What is the pattern for a model soapbox racer?
2. How do we measure the dimensions of geometric solids?
3. What is the correct process to create cutaway drawings?
4. Why do we draw architectural drawing?

### **Content Standards:**

1. Students will develop an understanding of the attributes of design.
2. Students will develop an understanding of engineering design.
3. Students will develop the abilities to apply the design process.
4. Students will develop an understanding of and be able to select and use information and communication technologies.

### **Activities:**

1. Introduction to CADD – define CADD, give examples of occupations in which CADD is used, and learn the alphabet of lines.
2. Multiview Drawings – create and dimension a multiview drawing.
3. Creating a Floor Plan – create a floor plan for a house and evaluate the floor plan indicating how the plan could be improved.

### **Assessments:**

1. Pre test
2. RCA questions
3. Teacher assessment questions
4. Activities
5. Participation
6. Attendance
7. Post test

# **Module: CNC Manufacturing**

## **Overview:**

Students explore the manufacturing process and important inventions that have advanced these various processes. Students learn the relationship of software to manufacturing and use software to design a project that is later machined on the Z-Mill. The Cartesian coordinate system and its effects on machine movement and digital automation are also presented.

## **Essential Questions:**

1. What are the safety procedures for operating the Z-Mill?
2. Why are tolerances and specifications important to the manufacturing process?
3. What is the Cartesian coordinate system and how it relates to the Z-Mill's movement?
4. How do we use the Z-Mill software to prepare a pre-drawn graphic for the milling process?

## **Content Standards:**

1. Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.
2. Students will develop an understanding of the role of society in the development and use of technology.
3. Students will develop the abilities to apply the design process.
4. Students will develop the abilities to use and maintain technological products and systems.
5. Students will develop an understanding of and be able to select and use manufacturing technologies.

## **Activities:**

1. CNC Basics – explain specifications, tolerance, and the use of each of the Z-Mill's control buttons and demonstrate proper setup of the mill and the layout process.
2. Advantages of CNC – relate the Cartesian coordinate system to 3-D, demonstrate the use of the Z-Mill, and list advantages of CNC over manual control.
3. Z-Mill Challenge – produce a self-designed, 3-D project to given specifications.

## **Assessments:**

1. Pre test
2. RCA questions
3. Teacher assessment questions
4. Activities
5. Participation
6. Attendance
7. Post test

# **Module: Computer Graphics and Animation**

## **Overview:**

Students learn how the use of computers can enhance products created by professional artists and animators. With the use of a computer and related software, students produce an animated sequence using cartoon characters. Students use a digital camera to capture a picture and create an animated project. Students also explore video animation design.

## **Essential Questions:**

1. What is graphic design?
2. How do you create and produce animated sequences using computer software?
3. How do you capture an image with a digital camera and manipulate the picture with morphing software?
4. What math skills do you use to solve graphics-related problems?

## **Content Standards:**

1. Students will develop an understanding of the characteristics and scope of technology.
2. Students will develop an understanding of the attributes of design.
3. Students will develop the abilities to apply the design process.
4. Students will develop an understanding of and be able to select and use information and communication technologies.

## **Activities:**

1. VR Walk-Through – use a computer software program to create a virtual environment.
2. 3-D Logo Design – creates a 3-D logo and renders it using 3-D software.
3. Final 3-D Animation – identifies at least one advantage of using a computer for generating graphics or animations and identifies at least one example of computer-generated graphics.

## **Assessments:**

1. Pre test
2. RCA questions
3. Teacher assessment questions
4. Activities
5. Participation
6. Attendance
7. Post test

# **Module: Digital Design**

## **Overview:**

Students are introduced to the principles of design that lead to effective visual communication. This Module also addresses the process involved when creating a layout. Students learn how correct usage of the various elements leaves the reader with a clear understanding of the intended message. The psychology used with design and layout is explained, including the optical center, the “eye catcher,” and eye movement through the material and off the piece.

## **Essential Questions:**

1. What are the design principles commonly used for graphic communication?
2. Why does the eye travel from element to element within a design?
3. How is psychology used to communicate a message when designing?
4. What ways do logos convey meaning?
5. What is the difference between formal and informal balance?

## **Content Standards:**

1. Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.
2. Students will develop an understanding of the role of society in the development and use of technology.
3. Students will develop an understanding of the attributes of design.
4. Students will develop the abilities to apply the design process.

## **Activities:**

1. FreeHand Newsletter – use software to design and create a newsletter and import both graphics and text.
2. Letterhead – design and create a letterhead, correctly import graphics and text, and cut and paste from templates.
3. T-shirt Design – use a software program to create a design for a T-shirt.

## **Assessments:**

1. Pre test
2. RCA questions
3. Teacher assessment questions
4. Activities
5. Participation
6. Attendance
7. Post test

# Module: Digital Transportation

## Overview:

Students learn that transportation is the movement of people and goods. They see a brief history and time line of transportation from humans walking through space travel. This includes transportation on land and water and through air (atmosphere) and space. Students experience the latest technologies that impact transportation through the use of digital map-reading and locating software and a Global Positioning System (GPS).

## Essential Questions:

1. What is the definition of transportation?
2. How do we use latitude and longitude to navigation?
3. What is the use of a GPS to pinpoint a location on Earth?
4. What is package-tracking?

## Content Standards:

1. Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.
2. Students will develop an understanding of the role of society in the development and use of technology.
3. Students will develop the abilities to use and maintain technological products and systems.
4. Students will develop an understanding of and be able to select and use transportation technologies.

## Activities:

1. Weekend Trip Planner – use mapping software to calculate different routes for a trip while learning the concepts of direction.
2. Scavenger Hunt – use mapping software to answer questions related to degrees, minutes, latitude, and longitude.
3. GPS – use a Global Positioning System (GPS) in conjunction with mapping software to locate the latitude and longitude of the student's position.

## Assessments:

1. Pre test
2. RCA questions
3. Teacher assessment questions
4. Activities
5. Participation
6. Attendance
7. Post test

## **Module: Digital Video**

### **Overview:**

Students enter the world of digital editing and step into the creative role of editor. After being introduced to the preproduction phases of video, they learn the importance of computer power in the digital editing process. Students are exposed to elements that include good editing principles, special effects, and manipulation of data, both audio and video.

### **Essential Questions:**

1. What are three editing principles: sequencing, continuity, and pacing?
2. Why would we use the technique of editing sound into a video project?
3. How are preproduction, production, and postproduction different?
4. What are the advantages of digital editing versus analog editing?
5. What is the main difference between time lapse and slow motion?

### **Content Standards:**

1. Students will develop an understanding of the cultural, social, economic, and political effects of technology.
2. Students will develop an understanding of the role of society in the development and use of technology.
3. Students will develop the abilities to use and maintain technological products and systems.
4. Students will develop an understanding of and be able to select and use information and communication technologies.

### **Activities:**

1. Fruity Gulp Storyboard – use a computer program to sequence a commercial correctly.
2. Hartman Interview Storyboard – storyboard and compile clips to create an interview video.
3. World Tour Storyboard – demonstrate the processes of chroma keying a live image onto a fake background.

### **Assessments:**

1. Pre test
2. RCA questions
3. Teacher assessment questions
4. Activities
5. Participation
6. Attendance
7. Post test

# Module: Electricity

## Overview:

Students learn the principles of electricity and draw a schematic of a parallel and series circuit. Students complete a series and parallel circuit as well as classify conductors and insulators. They use a voltage and ohm meter, and they identify the magnetic fields important to the concept of electricity. Students also measure voltage, resistance, and current during the Module activities.

## Essential Questions:

1. How are series and parallel circuit different?
2. What is the difference between voltage, current, and resistance?
3. Where are conductors and insulators used in our society?
4. What are the concepts of electricity and magnetism?

## Content Standards:

1. Students will develop an understanding of the core concepts of technology.
2. Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.
3. Students will develop an understanding of the effects of technology on the environment.
4. Students will develop the abilities to assess the impact of products and systems.
5. Students will develop an understanding of and be able to select and use energy and power technologies.

## Activities:

1. Electricity Basics – demonstrate and define the term *circuit* and draw and assemble a circuit.
2. Series and Parallel Circuits – wire a motor circuit, explain the use of an on/off switch, and wire and reverse a DC motor using a knife switch.
3. Measuring Resistance – demonstrate the proper care of a multimeter (VOM) and identify and explain insulators and conductors.

## Assessments:

1. Pre Test
2. RCA questions
3. Teacher assessment questions
4. Activities
5. Participation
6. Attendance
7. Post Test

## **Module: Energy, Power and Mechanics**

### **Overview:**

When students complete *Energy, Power & Mechanics*, they have a basic understanding of energy sources, the principles of power technology, and the concept of mechanical advantage and machines. Students see how fluids can be used with other simple machines. Using Synergistic educational instruments, students learn the fundamentals of gears, fluid mechanics, and three classes of levers. Students also use a solar hot dog cooker and experience the concept of wind power.

### **Content Standards:**

1. Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.
2. Students will develop an understanding of the role of society in the development and use of technology.
3. Students will develop an understanding of and be able to select and use energy and power technologies.
4. Students will develop an understanding of and be able to select and use transportation technologies.

### **Essential Questions:**

1. What are gears and gear ratios?
2. What are the three classes of levers?
3. Where are pneumatics, hydraulics, and gears in your home?
4. How are renewable and nonrenewable energy sources used in our society?

### **Activities:**

1. Wind Energy – set up equipment, enter data into the computer, and defend conclusions about blade angles based on their data.
2. Levers – set up an educational instrument, enter data on-screen, and give examples of the three classes of levers.
3. Fluid Systems – describe a pump using a cylinder and valves and demonstrate proper connections.

### **Assessments:**

1. Pre Test
2. RCA questions
3. Teacher assessment questions
4. Activities
5. Participation
6. Attendance
7. Post Test

# **Module: Engineering Bridges**

## **Overview:**

Students solve an engineering problem as a team. Their task is to build a balsa wood bridge that will span a space and hold the most weight before breaking. There are certain rules that the students must follow to build their bridges correctly. Students learn the relationships between design, structure, and strength of a bridge. By building a bridge and testing its strength on a structure tester, students learn valuable engineering concepts and principles.

## **Essential Questions:**

1. How do you use a worksheet to illustrate a bridge design?
2. Why do you convert the bridge designs to full-size patterns?
3. What are two forces that act upon a structure?
4. What are the main differences between arch and cantilever bridges?

## **Content Standards:**

1. Students will develop an understanding of the effects of technology on the environment.
2. Students will develop an understanding of the influence of technology on history.
3. Students will develop an understanding of engineering design.
4. Students will develop the abilities to apply the design process.
5. Students will develop an understanding of and be able to select and use construction technologies.

## **Activities:**

1. Designing Your Bridge – create three thumbnail sketches of possible bridge designs, choose a design, defend why a bridge design was chosen, and draw a full-size pattern of the selected thumbnail sketch.
2. Bridge Construction – demonstrate the proper use of the Timber Cutter and begin cutting pieces for bridges.
3. Final Assembly – meet the bridge building specifications and complete the bridges.

## **Assessments:**

1. Pre Test
2. RCA questions
3. Teacher assessment questions
4. Activities
5. Participation
6. Attendance
7. Post Test

# **Module: Flight Technology**

## **Overview:**

Students learn the principles of flight. Students use a computer flight simulator to experience piloting an aircraft. Each student evaluates the other and prepares a written critique of his or her partner's flight. Students are introduced to navigation and plot a course using angular measurement and mathematical computation.

## **Essential Questions:**

1. What are the four basic principles of aerodynamics?
2. What is Bernoulli's principle?
3. Why is lift important to flight of an airplane?
4. How do you determine the direction and distance for a flight plan?

## **Content Standards:**

1. Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.
2. Students will develop an understanding of the influence of technology on history.
3. Students will develop the abilities to apply the design process.
4. Students will develop an understanding of and be able to select and use transportation technologies.

## **Activities:**

1. Basic Aerodynamics – identify Bernoulli's principle and the effect of velocity on pressure and the effects and factors of stall, force, and lift of an airfoil.
2. Wing Testing – design, build, and test a wing using a wing tester.
3. Navigation – demonstrate an understanding of how to calculate distance in nautical and statute miles and identify necessary tools during a flight.

## **Assessments:**

1. Pre Test
2. RCA questions
3. Teacher assessment questions
4. Activities
5. Participation
6. Attendance
7. Post Test

## **Module: Forces**

### **Overview:**

Students explore forces and how they affect the motion of objects. Students learn to describe and measure the motion of objects by completing distance, time, speed, and velocity measurement activities. Students use examples they already find relevant to learn about various forces. They describe and measure the changing motion of accelerating objects and observe the direction of motion and how radius affects centripetal acceleration.

### **Essential Questions:**

1. How do you calculate the force of gravity on a massive object in newtons?
2. What are balanced and unbalanced forces acting on an object?
3. What is the difference between speed and velocity?
4. Explain Newton's three laws of motion.
5. What is the difference between mass and weight?

### **Content Standards:**

1. Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.
2. Students will develop an understanding of the effects of technology on the environment.
3. Students will develop an understanding of and be able to select and use energy and power technologies.

### **Activities:**

1. Speed and Velocity – use an air table, inclined ramp, and photo gates to study objects moving at nearly constant speed and velocity.
2. Acceleration – measure the changing motion of accelerating objects due to the force of gravity.
3. Falling Objects – study Newton's three laws of motion to learn how gravity affects a variety of falling objects.

### **Assessments:**

1. Pre Test
2. RCA questions
3. Teacher assessment questions
4. Activities
5. Participation
6. Attendance
7. Post Test

# Module: Graphic Communications

## Overview:

Students learn the fundamentals of drafting and communication of technical information. They also learn to use the related tools (drawing board, scale, triangles, and T square) needed to complete various drawings such as orthographic projections. Design and measurement skills are also emphasized. The skills introduced in the Module will assist students throughout their lives.

## Essential Questions:

1. Name the six basic drafting tools.
2. Why do we use various drafting symbols?
3. Explain what a 1/4" scale means?
4. How do you show proper techniques used for dimensioning?

## Content Standards:

1. Students will develop an understanding of the influence of technology on history.
2. Students will develop an understanding of the attributes of design.
3. Students will develop an understanding of engineering design.
4. Students will develop an understanding of and be able to select and use information and communication technologies.

## Activities:

1. Introduction to Drafting – explain how drafting is a form of communication, why drafting is called the language of industry, and the different divisions used when measuring in inches and metrics.
2. Getting Started – define and describe the function of a drawing board, T square, and triangles.
3. Geometry – display an understanding of geometric terms such as octagon, hexagon, equilateral triangle, and square.

## Assessments:

1. Pre Test
2. RCA questions
3. Teacher assessment questions
4. Activities
5. Participation
6. Attendance
7. Post Test

## Module: Home Makeover

### Overview:

Students in *Home Makeover* put math skills to use as they plan an addition to a home. Students learn the basics involved in financing a home, designing roofs, building trusses, purchasing Sheetrock and floor covering, and calculating the amount of roofing, interior paint, and siding needed for the home's exterior.

### Essential Questions:

1. What are three styles of roofs?
2. What is the slope of a roof?
3. Name three truss designs.
4. What is the amount of floor covering and Sheetrock needed for a 10' x 20' addition?

### Content Standards:

1. Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.
2. Students will develop the abilities to use and maintain technological products and systems.
3. Students will develop an understanding of the role of society in the development and use of technology.
4. Students will develop the abilities to assess the impact of products and systems.
5. Students will develop an understanding of and be able to select and use construction technologies.

### Activities:

1. Roof Trusses – explain how to find slope, explain how to determine brace locations in trusses, and construct a model truss.
2. Floor Plan Revisions – demonstrate and explain how to determine the dimensions of a room based on the floor plan.
3. Deck Design – design a deck using CAD, evaluate the deck, and explain how a deck extends living area in a home.

### Assessments:

1. Pre Test
2. RCA questions
3. Teacher assessment questions
4. Activities
5. Participation
6. Attendance
7. Post Test

## **Module: Interior Design**

### **Overview:**

Students will study many concepts that today's interior decorator utilizes on a daily basis. They explore the principles of design, color coordination, floor plans, home furnishings, and remodeling budgets. Students learn about the relationships between material costs and personal choices by creating a cost proposal for a remodeling project.

### **Essential Questions:**

1. What is a cost proposal for a remodeled room?
2. What is the difference between material cost and individual preference?
3. What is a color wheel and where do we use it?
4. Where would you use natural and artificial light in your home?

### **Content Standards:**

1. Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.
2. Students will develop an understanding of the attributes of design.
3. Students will develop an understanding of engineering design.
4. Students will develop the abilities to apply the design process.
5. Students will develop the abilities to use and maintain technological products and systems.

### **Activities:**

1. Wall Composition – study and explore proportion, harmony, and balance as it pertains to wall composition.
2. Interior Lighting – explain the difference between natural and artificial light as well as the principles and elements of design.
3. Remodeling Budget – create a remodeling budget to redecorate a bedroom using a price list.

### **Assessments:**

1. Pre Test
2. RCA questions
3. Teacher assessment questions
4. Activities
5. Participation
6. Attendance
7. Post Test

## **Module: Light and Lasers**

### **Overview:**

Students explore aspects of light and lasers and see how that technology can be used. Students use geometric concepts to divide and reflect a laser beam along a path and to create a security system utilizing the beam. Light is explored and manipulated through experiments that use lenses, prisms, filters, and intensity meters. The data from these experiments is analyzed and interpreted to provide a clear picture of the nature of light.

### **Essential Questions:**

1. What are the properties of light?
2. Define reflection, color, and intensity of light.
3. What are the effects of a prism on white light and laser light?
4. Why are there different effects of distance and color on intensity?

### **Content Standards:**

1. Students will develop an understanding of the characteristics and scope of technology.
2. Students will develop an understanding of the core concepts of technology.
3. Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.
4. Students will develop an understanding of and be able to select and use energy and power technologies.
5. Students will develop an understanding of and be able to select and use information and communication technologies.

### **Activities:**

1. Reflection – explain the relationship between the angle of incidence and the angle of reflection.
2. Magnification – describe the magnification properties of a convex lens and a concave lens.
3. Intensity – explains what determines the color and intensity of light and explains why a color paddle decreases the intensity of the light passing through it.

### **Assessments:**

1. Pre Test
2. RCA questions
3. Teacher assessment questions
4. Activities
5. Participation
6. Attendance
7. Post Test

## **Module: Natural Disasters**

### **Overview:**

Students briefly explore various categories of natural disasters. They learn the scientific concepts underlying the cause and the general effects of each disaster, as well as locations in the U.S. and around the world where each type of disaster is most likely to strike. They do activities to demonstrate both scientific concepts and methods of measuring and tracking the process. Finally, they develop a school disaster plan based on given conditions.

### **Essential Questions:**

1. Where are the major tectonic plates on a world map?
2. Name three types of volcanic rocks.
3. How is a tsunami produced?
4. What are the scales used to measure earthquakes, hurricanes, and tornadoes?

### **Content Standards:**

1. Students will develop an understanding of the characteristics and scope of technology.
2. Students will develop an understanding of the core concepts of technology.
3. Students will develop an understanding of the effects of technology on the environment.
4. Students will develop an understanding of the role of society in the development and use of technology.

### **Activities:**

1. Earthquakes – explain how fault lines and plate boundaries relate to earthquakes, demonstrate the use of a seismograph, and explain the Richter scale.
2. Waves – illustrate parts of a wave, demonstrate wavelength and frequency, and compare tsunami waves to wind waves.
3. Circular Storms – compare hurricanes and tornadoes, plot a hurricane's path, and demonstrate hurricane wind fields.

### **Assessments:**

1. Pre Test
2. RCA questions
3. Teacher assessment questions
4. Activities
5. Participation
6. Attendance
7. Post Test

## **Module: Package Design**

### **Overview:**

Students design and construct a package for a specified product. They explore spatial relationships as well as transformations and use rotations, reflections, and translations to create tessellations used as graphics for packages. Students select the package's shape based on appearance and practicality and design packages to conserve as much material and space as possible. Students also explore how transformations can be used in art.

### **Essential Questions:**

1. What is the formula to calculate volume and circumference?
2. What are the different types of transformations?
3. Define tessellation.
4. What are the uses of tessellations in art?

### **Content Standards:**

1. Students will develop an understanding of the influence of technology on history.
2. Students will develop an understanding of the attributes of design.
3. Students will develop the abilities to apply the design process.
4. Students will develop the abilities to use and maintain technological products and systems.
5. Students will develop the abilities to assess the impact of products and systems.

### **Activities:**

1. Package Layout – study package design and design a package from a geometric net.
2. Rotations, Reflections, and Translations – study rotations, reflections, and translations of a figure and the coordinates on a grid.
3. Package Construction – construct and evaluate a package to hold a product and identify ways to improve the package.

### **Assessments:**

1. Pre Test
2. RCA questions
3. Teacher assessment questions
4. Activities
5. Participation
6. Attendance
7. Post Test

## **Module: Personal Finance**

### **Overview:**

Students explore several different aspects of money management – from opening a checking account to building savings for the future. They see the effects that compound and simple interest can have on savings and debt. Furthermore, they develop a budget and explore how choices about their lifestyles can affect the types of careers they choose. The goal is for wise financial decisions made in the Module to be repeated in real life.

### **Essential Questions:**

1. Name three personal banking accounts?
2. What is the proper way to write a check to the teacher?
3. Name four places you would use a credit card?
4. What is simple and compound interest?

### **Content Standards:**

1. Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.
2. Students will develop an understanding of the cultural, social, economic, and political effects of technology.
3. Students will develop an understanding of the role of society in the development and use of technology.
4. Students will develop an understanding of and be able to select and use information and communication technologies.

### **Activities:**

1. Balancing Act – define a monthly budget and defend the relationship of a budget with the decision of how and where to live.
2. Checking Account – apply for a checking account, fill out checks properly, and explain the importance of keeping an up-to-date check register.
3. Purchases – compute the cost of making purchases on credit using different terms.

### **Assessments:**

1. Pre Test
2. RCA questions
3. Teacher assessment questions
4. Activities
5. Participation
6. Attendance
7. Post Test

# Module: Plastics and Polymers

## Overview:

Students explore several types of polymers, including plastics. The students explore the basic concepts of atoms, molecules, and compounds. This enables students to better understand the properties of the plastics and polymers they create and manipulate. Students create, mold, recycle, and form various polymers. These activities provide a better understanding of the usefulness and limitations of the materials.

## Essential Questions:

1. Define atoms, molecules, and compounds as it relates to plastics?
2. What are four uses for various polymers?
3. Why are strength, malleability, and flexibility important properties of plastics?
4. What are three properties of polymers?

## Content Standards:

1. Students will develop an understanding of the core concepts of technology.
2. Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.
3. Students will develop an understanding of the effects of technology on the environment.
4. Students will develop an understanding of the role of society in the development and use of technology.
5. Students will develop the abilities to use and maintain technological products and systems.
6. Students will develop the abilities to assess the impact of products and systems.

## Activities:

1. Atoms, Molecules, and Polymers – define basic terms related to polymers and explore a polymer's characteristics.
2. Polymer Analysis – compare and contrast student-created polymers and the methods for storing these polymers.
3. Recycling Polymers – create injection-molded golf tees from different polymers and evaluate the properties of recycled polymers.

## Assessments:

1. Pre Test
2. RCA questions
3. Teacher assessment questions
4. Activities
5. Participation
6. Attendance
7. Post Test

## **Module: Practical Skills**

### **Overview:**

Students learn to identify common tools and their uses. They will be introduced to the history of measuring systems, repair faulty systems, and follow directions to assemble prefabricated furniture. One important skill is to recognize situations when it would be best to call in a professional to help them solve the problem.

### **Essential Questions:**

1. What is the importance of following a set of instructions?
2. Name four hand tools we use around the home for repairs?
3. What is the function of a home plumbing system?
4. What are three items we can purchase for home security?
5. Why is it important to measure everything twice?

### **Content Standards:**

1. Students will develop an understanding of the influence of technology on history.
2. Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.
3. Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
4. Students will develop an understanding of and be able to select and use construction technologies.
5. Students will develop the abilities to use and maintain technological products and systems.
6. Students will develop the abilities to assess the impact of products and systems.

### **Activities:**

1. Measurement – demonstrate the proper safety and use of the ruler and tape measure.
2. Mounting Shelf Brackets – demonstrate proper safety and use of various tools, explain how mechanical fasteners work, and produce a horizontally level shelf.
3. Prefabricated Pull Cart – correctly and completely assemble a prefabricated item and explain how following directions can save time.

### **Assessments:**

1. Pre Test
2. RCA questions
3. Teacher assessment questions
4. Activities

5. Participation
6. Attendance
7. Post Test

## **Module: Research and Design**

### **Overview:**

Students design, manufacture, and race a model CO<sub>2</sub>-powered dragster car. Students design their car to meet certain specifications and limitations so that it qualifies as a legal car on race day. They learn the concepts and terms in the design process as well as gain an understanding of lift and drag on an object. After they finish their car, students test it in several ways and predict its performance.

### **Essential Questions:**

1. Why is the design of the CO<sub>2</sub> car so important?
2. What are four safety rules to use around power tools?
3. What is aerodynamics and how does it affect a CO<sub>2</sub> car?
4. How does mass affects the performance of a CO<sub>2</sub>-powered dragster?

### **Content Standards:**

1. Students will develop an understanding of the influence of technology on history.
2. Students will develop an understanding of the attributes of design.
3. Students will develop an understanding of and be able to select and use manufacturing technologies.
4. Students will develop the abilities to apply the design process.

### **Activities:**

1. Design Your Dragster – demonstrate or explain the concept of initial design sketches and follow limitations when designing the dragster.
2. Smooth Your Dragster – demonstrate the work skills necessary to produce a quality product.
3. Test and Predict Performance – meet all limitations set for the dragster and relate test results with actual dragster performance on a racetrack.

### **Assessments:**

1. Pre Test
2. RCA questions
3. Teacher assessment questions
4. Activities
5. Participation
6. Attendance
7. Post Test

# Module: Robots

## Overview:

Students learn about the fascinating role that robots play in our lives. More and more, this technology is helping to improve the way we live and manufacture items. Students learn how to operate, program, and use robots in different environments. Initially, each student learns to manipulate the robot and program it to conduct repeatable tasks. Ultimately, they operate a robot located in a remote location away from direct view via a televised image of the work task.

## Essential Questions:

1. How are robots used in the manufacturing industry?
2. What are three advantages and three disadvantages of robots?
3. What is a Cartesian coordinate system?
4. Name three places where robots are used in dangerous environments.

## Content Standards:

1. Students will develop an understanding of the core concepts of technology.
2. Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.
3. Students will develop an understanding of the cultural, social, economic, and political effects of technology.
4. Students will develop an understanding of the role of society in the development and use of technology.
5. Students will develop an understanding of the influence of technology on history.
6. Students will develop an understanding of and be able to select and use transportation technologies.
7. Students will develop an understanding of and be able to select and use manufacturing technologies.

## Activities:

1. Exploring Robots – learn several uses for robots and give one example of a repetitive job that a robot might perform.
2. Programming SAM – demonstrate the process of teaching SAM a series of moves and complete and save a logical series of programmed movements.
3. Rooster Challenge – maneuver the Rooster using the Radio Control System.

## Assessments:

1. Pre Test
2. RCA questions
3. Teacher assessment questions
4. Activities
5. Participation
6. Attendance
7. Post Test

# **Module: Rocketry & Space**

## **Overview**

Students learn about the development of rocketry and the United States space program and its history. Learning the principles of rocket design, propulsion, and certain scientific principles that are fundamental to successful rocket flight are important concepts in this Module. Students construct and launch a model rocket as a means of applying the scientific concepts presented.

## **Essential Questions**

1. When did we first land on the moon?
2. When was the first space shuttle launched?
3. What are the scientific principles of rocketry and space flight?
4. What is Aerodynamics and how does affect the flight of the rocket?

## **Content Standards:**

1. Students will develop an understanding of the effects of technology on the environment.
2. Students will develop an understanding of the role of society in the development and use of technology.
3. Students will develop an understanding of the influence of technology on history.
4. Students will develop an understanding of the attributes of design.
5. Students will develop an understanding of and be able to select and use transportation technologies.
6. Students will develop an understanding of and be able to select and use manufacturing technologies.

## **Activities:**

1. Describe the main stages of rocket flight.
2. Rocket Kit Assembly.
3. Rocket Painting.
4. Fly the Rocket.

## **Assessments:**

- 1) Pre test
- 2) RCA questions
- 3) Teacher assessment questions
- 4) Activities
- 5) Participation
- 6) Attendance
- 7) Post test

## **Module: Simple Machines**

### **Overview:**

Students explore how work, force, energy, and machines make moving objects easier through the use of the computer and hands-on activities. Students use variables and equations to describe the principles of simple machines. Students use the information they learn about simple machines to design a compound machine that moves an object.

### **Essential Questions:**

1. How are simple machines used to convert small input force to large output force?
2. How do you use the scientific method to determine the mechanical advantage of simple machines?
3. What is a compound machine that moves an object?
4. What is a mechanical advantage?

### **Content Standards:**

1. Students will develop an understanding of the core concepts of technology.
2. Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.
3. Students will develop an understanding of the influence of technology on history.
4. Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
5. Students will develop an understanding of and be able to select and use manufacturing technologies.

### **Activities:**

1. Inclined Planes – calculate the length of an inclined plane and the mechanical advantage.
2. Levers – explain how levers make work easier; demonstrate and explain how to use a lever to lift a five-newton weight with less than five newtons of force.
3. Compound Pulleys – explain the relationship between the mechanical advantage of a pulley system and the number of pulleys.

### **Assessments:**

1. Pre Test
2. RCA questions
3. Teacher assessment questions
4. Activities
5. Participation
6. Attendance
7. Post Test

# **Module: Webmaster**

## **Overview:**

Students explore the role of a Webmaster, or Internet Web site manager. Students are responsible for the planning, designing, developing, and maintaining of an Internet Web site on the topic of their choice that is worthy of being published to the World Wide Web.

## **Essential Questions:**

1. When did the internet get started?
2. What are the four main steps involved in Web site development?
3. How do you add text and image links within a Web site?
4. Where would you publishing and managing a Web site?

## **Content Standards:**

1. Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.
2. Students will develop an understanding of the role of society in the development and use of technology.
3. Students will develop an understanding of the influence of technology on history.
4. Students will develop the abilities to apply the design process.
5. Students will develop an understanding of the attributes of design.
6. Students will develop an understanding of and be able to select and use information and communication technologies.

## **Activities:**

1. Links – describe the purpose of a hyperlink, differences between internal and external links, and show the ability to add text and graphic links to an HTML page.
2. Tables – define terms related to a table, describe the purpose of a table and the type of media a table can contain, and show the ability to arrange the layout of a table.
3. Final Project – create a Web site that meets specific criteria.

## **Assessments:**

1. Pre Test
2. RCA questions
3. Teacher assessment questions
4. Activities
5. Participation
6. Attendance
7. Post Test

# Cabinetmaking I

## Curriculum

### Course Description:

ELECTIVE	ELIGIBILITY	PREREQUITE	CREDIT
	10, 11, 12	None	1

The course of related study in cabinetmaking is designed to meet the student's individual needs by examining related industries, processes, and systems used to fabricate cabinets and furniture products. Each student will design, fabricate, finish, and evaluate a cabinet/furniture related project which meets stated criterion. Students will build a smaller to medium sized project for this class, so that more time learning the basic foundations for Cabinetmaking could be gained. Students will learn machine safety and proper use of each machine and tool in the shop. The students will be able to identify each tool by its correct name, know its uses, and learn the basic wood joints and their applications. All students would give a 5 minute presentation on a Cabinetmaking related topic. Materials and supplies used for the required projects are provided. Each student receives a 1/2 sheet of 3/4" oak plywood, 1/2 sheet of 1/4" oak plywood, 1/2 sheet of 3/4" particle board, and about 15 board feet of 3/4" solid oak. The students will need to get their own hardware and stain if they choose to stain the project. The students will also need to provide their own pencil and tape measure for this class. Materials needed to make a project beyond the requirements are the student's responsibility and must be brought in from an outside source. Projects will be on display through the teacher's website.

### Philosophy:

Technology Education is a vital link in the general education experience of all students. All students are able to actively participate in quality experiences that incorporate technical, academic, problem solving, and basic skills which will enable each student to adapt to an ever-changing world. Technologically literate students with problem solving and manipulative skills will enter the employment market with qualities that will enhance their success.

### Units:

- Hand Tools
- Power Tools
- Stationary Machines
- Safety
- Materials
- Measuring – Fractions, Tape Measure, Board Feet.
- Making a Cabinet
- Wood Joints
- Design: Draw Plans, Read Plans, Estimate Cost, and Create Cut List
- Lab – Building Project
- Careers – In the Industry

## Finishing: Processes and Techniques

# Cabinetmaking I: Careers

There are many jobs available in the cabinetmaking position. If you are willing to be punctual, honest, are willing to be trained, and work hard then you are a perfect candidate for a career in the cabinetmaking industry. No matter how much experience you have, if you start working in the cabinetmaking industry, the business will retrain you on how they want you to work.

## Essential Questions:

1. Why should I work in the cabinetmaking industry?
2. What does the cabinetmaking industry provide that other industries may not provide?
3. What are the minimum requirements for working in the cabinetmaking industry?
4. What should I look for when applying for a job in the cabinetmaking industry?

## Standards:

CM2.3 Identify proper terminology and examine career possibilities

## Content/Activities:

- The students will be able to identify the different positions within the cabinetmaking industry and know some of the duties of each position.
- The students will be able to identify the correct salary that applies to each position in the cabinetmaking industry
- The students will be able to comprehend the pros and cons of working in the cabinetmaking industry.

## Assessment:

Unit Test, Class Discussions

# Cabinetmaking I: Design

It is important to be able to create project plans that are drawn and designed correctly. When you create a final draft of project plans, you want them to be detailed enough that anyone can look at your plans and make your project without any extra questions. Often times while working in the cabinetmaking industry all you are given to work with is a set a plans. These plans are all the information you get to create a set of cabinets or piece of furniture. Having detailed plans so that you get an accurate estimate for your project is important.

## Essential Questions:

1. What is the correct way to write dimensions on your plans?
2. Why is it important that the final draft be perfect?
3. What happens when you lose or misplace your project plans?
4. What is a cut list?

## Standards:

- CM 2.1 Select variations of cabinets.
- CM 3.1 Design a blueprint for the finished project.

## Content/Activities:

- The students will be able to draw a detailed set of final plans.
- The students will be able to identify the different views in a set of plans.
- The students will work with a deadline in place when creating their plans.

## Assessment:

Unit Test, Deadlines for Drafts, Final Draft Turned In

# Cabinetmaking I: Hand Tools

Hand tools are a vital part of the cabinetmaking industry. Hand tools are used on a daily basis and are as common and simple as a pencil. Many home owners use hand tools to do general maintenance on their home. Most people, at some point in their lives, will own a home. For this and other reasons, it would be helpful for you to understand how to use hand tools.

## Essential Questions:

1. Why are hand tools still important?
2. Why would it be important to know the correct names of the different hand tools?
3. What is the main difference between hand tools, power tools, and stationary machines?
4. What are some of the main manufactures of hand tools?
5. What is the main advantage of hand tools?

## Standards:

CM1.1 – Apply hand/power tool and lab safety

## Content/Activities:

- The students will comprehend the correct names of all the hand tools in the shop.
- The students will comprehend the correct application of all the hand tools in the shop.
- The students will demonstrate the safe operation of all the hand tools in the shop.

## Assessment:

Unit Test

# Cabinetmaking I: Lab

Each student will be required to make an individual project. During this unit each student will apply the processes that we have learned and discussed to their own project. When the student finishes their project, they will be able to take their individual project home with them.

## Essential Questions:

1. What can I do to make my project the best?
2. Why should I not rush through and just slap some wood together?
3. What if I make a mistake while building?
4. What if it takes me longer than other people to build my project?

## Standards:

- CM 1.1 Apply hand/power tool and lab safety
- CM 2.1 Select variations of cabinets.
- CM 3.2 Illustrate the construction of the project.

## Content/Activities:

- The students will be able to apply each step in building a project.
- The students will be able to apply the correct finishing techniques.
- The students will be able to comprehend what to do if they make mistakes.
- The students will be able to apply the correct wood they have learned.

## Assessment:

Final Project Rubric, Class Discussions, Observations

# Cabinetmaking I: Making a Cabinet

Each student will be required to make an individual project. During this unit we will build a nightstand together as a class. If you understand the principle in building a nightstand, you can apply those principles to any other project, big or small.

## Essential Questions:

1. What does trim do for my project?
2. What does the face frame do for my project?
3. What type of fasteners do I use for my project?
4. What does the finishing process do for my project?

## Standards:

- CM 2.1 Select variations of cabinets.
- CM 3.2 Illustrate the construction of the project.

## Content/Activities:

- The students will be able to comprehend each step in building a project.
- The students will be able to identify the correct finishing techniques.
- The students will be able to comprehend the importance of sanding their project.
- The students will be able to identify the wood joints used to build the class nightstand.

## Assessment:

Unit Test, Class Discussions, Observations, Final Project

# Cabinetmaking I: Materials

There are many different types of materials that are used in the cabinetmaking industry. We will introduce you to many of the commonly used materials. Most of the materials you will be introduced to are available at your local lumber yard.

## Essential Questions:

1. What does the term “sheet goods” mean?
2. What is the difference in hardwoods and softwoods?
3. What are the main differences in oak and pine?
4. What are fasteners and what types are there?
5. What are the main parts of a tree?

## Standards:

- CM 2.1 Select variations of cabinets.
- CM 2.3 Identify proper terminology and examine career possibilities

## Content/Activities:

- The students will comprehend the differences between sheet goods and solid lumber.
- The students will identify differences in solid pine and solid oak, hardwood, or softwood.
- The students will be familiar with the different types of nails and how they are classified.
- The students will be familiar with the different types of screws used in the cabinetmaking industry.
- The students will be able to identify the different parts of a tree.

## Assessment:

Unit Test, Daily Observation

# Cabinetmaking I: Measuring

Using math in a variety of different ways is very important in any area of life. Learning how to read a tape measure is a skill that you will use throughout your life and possibly even your career. Being able to read a tape measure and knowing how to work with fractions is a must in the cabinetmaking industry. You will even use a tape measure and fractions when you own a home for repairs and even hanging pictures and/or shelves.

## Essential Questions:

1. How many equal parts is 1" of a tape measure commonly broken into?
2. What does "Board Feet" mean?
3. Why do you need to be able to convert feet to inches and inches to feet?
4. Why is it important to be able to read a tape measure?

## Standards:

CM 2.2 Describe the basics of math principles.

## Content/Activities:

- The students will be able to read a tape measure and know each of the markings.
- The students will be able to reduce fractions.
- The students will be able to add, subtract, multiply, and divide fractions
- The students will comprehend the board feet formula and be able to apply it.

## Assessment:

Unit Test, Daily Observation, Verbal Questions

# Cabinetmaking I: Power Tools

Power tools are more advanced in technology than the hand tools. Power tools are a vital part of the cabinetmaking industry because they make working in the industry easier and faster. Knowing how to operate each of the power tools safely will provide you with great skills that will be with you throughout a lifetime. Power tools are the most common types of tools used in any industry.

## Essential Questions:

1. What is the main advantage of power tools?
2. Why would it be important to know the correct names of the different power tools?
3. What is the main difference between power tools, hand tools, and stationary machines?
4. What are some of the main manufactures of power tools?

## Standards:

CM1.1 – Apply hand/power tool and lab safety

## Content/Activities:

- The students will comprehend the correct names of all the power tools in the shop.
- The students will comprehend the correct application of all the power tools in the shop.
- The students will demonstrate safe operation of all the power tools in the shop.
- The students will identify the correct storage area for each of the power tools in the shop.

## Assessment:

Unit Test

# Cabinetmaking I: Safety

Safety is one of the most valuable lessons you can learn. There is a big risk when working in a shop environment. We will train you to work safely in the shop. If you will follow all of the rules and procedures for the shop environment, you will be able to work safely in the shop.

## Essential Questions:

1. Why is safety important?
2. Who is concerned about safety in the work place?
3. What body parts are most at risk while working in the shop?

## Standards:

- CM1.1 – Apply hand/power tool and lab safety
- CM1.2 – Identify basic first aid procedures in emergency situations.

## Content/Activities:

- The students will comprehend the dangers associated with working in the shop.
- The students will identify different injuries that have occurred in the shop environment.
- The students will demonstrate safe practices while working in the shop.
- The students will be able to apply basic first aid while working in the shop.

## Assessment:

Unit Test, Daily Observation

# **Cabinetmaking I: Stationary Machines**

Stationary machines are a necessary part of the cabinetmaking industry. Knowing how to run the machine correctly and safely will give you an advantage when applying for a job in the industry. Understanding the correct principles and theories of how the machine works will enable you to use each of the machines safely.

## **Essential Questions:**

1. What is the main advantage of stationary machines?
2. Why would it be important to know the correct names of the different stationary machines?
3. What is the main difference between stationary machines, power tools, and hand tools?
4. What are some of the main manufactures of stationary machines?

## **Standards:**

CM1.1 – Apply hand/power tool and lab safety

## **Content/Activities:**

- The students will comprehend correct names of all the machines in the shop.
- The students will comprehend correct application of all the machines in the shop.
- The students will demonstrate safe operation of all the machines in the shop.
- The students will identify correct steps for minor maintenance on the machines in the shop.

## **Assessment:**

Unit Test

# Cabinetmaking I: Wood Joints

Being able to identify and make the commonly used wood joints is necessary for working in the cabinetmaking industry. Knowing the commonly used wood joints, when doing hobby work or while working on your home, is necessary. Understanding each of the wood joints so that you can fix wood joints when they fail in a furniture piece you own is also necessary.

## Essential Questions:

1. What do wood joints do for your project?
2. How do you decide which wood joint to use for your project?
3. What are the 4 most common wood joints in cabinetmaking?
4. Why is it important for you to know the correct applications for each wood joint?
5. What are the two main styles of cabinets?

## Standards:

- CM 2.1 Select variations of cabinets.
- CM 3.2 Illustrate the construction of the project

## Content/Activities:

- The students will be able to identify each of the commonly used wood joints.
- The students will be able to identify appropriate applications for each of the commonly used wood joints.
- The students will be able to produce each of the commonly used wood joints.
- The students will be able to comprehend different styles and techniques used in the cabinetmaking industry.

## Assessment:

Unit Test, Daily Observation, Check List

# Cabinetmaking II

## Curriculum

### Course Description:

ELECTIVE	ELIGIBILITY	PREREQUITE	CREDIT
	10, 11, 12	Cabinetmaking I	1

The course of related study in cabinetmaking is designed to meet the student's individual needs by examining related industries, processes, and systems used to fabricate cabinets and furniture products. Each student will design, fabricate, finish, and evaluate a cabinet or furniture related project which meets stated criterion. Students would need to build a larger project in the cabinet or furniture category. Less time would be spent learning the basic techniques and more time would be spent learning advanced techniques. Students would learn about and make more advanced wood joints. The students would have a research project to complete before the end of the semester. Students would learn more about the cabinet and furniture industries and look at them as possible career options. This class would provide students with the opportunities of fieldtrips to learn about the industry out in the job field. Materials and supplies used for the required projects are provided. The students would receive more wood than those students in the Cabinetmaking I classes.

### Philosophy:

Technology Education is a vital link in the general education experience of all students. All students would be able to actively participate in quality experiences that incorporate technical, academic, problem solving and basic skills which will enable each student to adapt to an ever-changing world. Technologically literate students with problem solving and manipulative skills will enter the employment market with qualities that will enhance their success.

### Units:

- Hand Tools
- Power Tools
- Stationary Machines
- Safety
- Materials
- Measuring – Fractions, Tape Measure, Board Feet.
- Making a Cabinet
- Wood Joints
- Design: Draw Plans, Read Plans, Estimate Cost, and Create Cut List
- Lab – Building Project
- Careers – In the Industry
- Finishing: Processes and Techniques

## **Cabinetmaking II: Careers**

There are many jobs available in the cabinetmaking position. If you are willing to work hard, be punctual, honest, and are willing to be trained you are a perfect candidate for a career in the cabinetmaking industry. No matter how much experience you have, if you start working in the cabinetmaking industry, the business will retrain you how they want you to work.

### **Essential Questions:**

1. Why is choosing a career so important?
2. What makes you a good candidate for working in the cabinetmaking industry?
3. What industry does the cabinetmaking industry fall into?

### **Standards:**

CM2.3 Identify proper terminology and examine career possibilities

### **Content/Activities:**

- The students will explore different jobs in the cabinetmaking and building trades industries.
- The students will research a career and give a short presentation on that career.
- The students will complete a resume related to work in the cabinetmaking industry

### **Assessment:**

Unit Test, Class Discussions, Presentation Rubric

# Cabinetmaking II: Design

Being able to create project plans that are drawn and designed correctly is important. When you create a final draft of project plans you want them to be detailed enough that anyone can look at your plans and make your project with out any extra questions. Often times, while working in the cabinetmaking industry, you are give a set of plans. These plans are all the information you get to create a set of cabinets or a piece of furniture. It is also important to have detailed plans so that you get an accurate estimate for your project.

## Essential Questions:

1. What does ANSI mean?
2. What unit of measure is used when drawing plans?
3. How many decimal places do you round to when drawing plans?
4. How do cabinetmakers use a cut list?

## Standards:

- CM 2.1 Select variations of cabinets.
- CM 2.3 Identify proper terminology and examine career possibilities
- CM 3.1 Design a blueprint for the finished project.

## Content/Activities:

- The students will be able to draw a detailed set of final plans.
- The students will be able to identify the different views in a set of plans.
- The students will work with a deadline in place when creating their plans.
- The students will comprehend terms related to drafting and drawing plans.

## Assessment:

Unit Test, Deadlines for drafts, Final Draft turned in

## **Cabinetmaking II: Hand Tools**

Hand tools are a vital part of the cabinetmaking industry. Hand tools are used on a daily basis and are as common and simple as a pencil. Many home owners use hand tools to do general maintenance on their home. Most people at some point in their lives will own a home and it would be helpful for you to understand how to use hand tools.

### **Essential Questions:**

1. How often will you use hand tools while working in the shop?
2. Are there still craftsmen who still do everything by hand tools?
3. How long have the hand tools we use in our shop been around?
4. Who are the manufacturers that produce the highest quality of hand tools?
5. What are the main safety risks while using hand tools?
6. Why is it important to know advanced techniques when using hand tools?

### **Standards:**

CM1.1 – Apply hand/power tool and lab safety

### **Content/Activities:**

- The students will comprehend the correct names of all the hand tools in the shop.
- The students will comprehend the correct application of all the hand tools in the shop.
- The students will demonstrate the safe operation of all the hand tools in the shop.
- The students will be familiar with the history of hand tools.
- The students will be able to identify hazards involved when working with hand tools.
- The students will be able to identify advanced techniques for using hand tools.

### **Assessment:**

Unit Test, Visual Observation

# Cabinetmaking II: Materials

There are many different types of materials that are used in the cabinetmaking industry. We will introduce you to many of the commonly used materials. Most of the materials you will be introduced to are available at your local lumber yard.

## Essential Questions:

1. What does the term “sheet goods” mean?
2. What is the difference in heartwood and sapwood?
3. Are there different species of wood beside oak and pine?
4. What does the term “penny” mean when working with nails?
5. What is the main part of a tree?

## Standards:

- CM2.1 Select variations of cabinets.
- CM2.3 Identify proper terminology and examine career possibilities
- CM2.3 Identify proper terminology and examine career possibilities

## Content/Activities:

- The students will be able to identify the differences in different sheet goods.
- The students will identify differences in all types of solid lumber.
- Students will be able to identify the different types of nails commonly used in cabinetmaking.
- Students will be able to identify the different types of screws commonly used in cabinetmaking.
- The students will be able to identify the veneer patterns in sheet goods.
- The students will comprehend the terms associated with materials used in cabinetmaking.

## Assessment:

Unit Test, Daily Observation

## Cabinetmaking II: Measuring

Using math in a variety of different ways is important in any area of life. Learning how to read a tape measure is a skill that you will use throughout your life and possibly even your career. Being able to read a tape measure and knowing how to work with fractions is something that is a must in the cabinetmaking industry. You will even use a tape measure and fractions when you own a home for repairs and even hanging pictures and/or shelves.

### Essential Questions:

1. When would you need to measure as accurate as a  $1/32$ ”?
2. Why is it important to make a test piece when working with new formulas?
3. How do you convert a decimal to a fraction?
4. What unit of measure do other countries use?

### Standards:

CM 2.2 Describe the basics of math principles.

### Content/Activities:

- The students will be able to read a tape measure and know each of the markings.
- The students will be able convert decimals to fractions.
- The students will be able to add, subtract, multiply, and divide fractions
- The students will comprehend and apply advanced formulas when working in the shop.

### Assessment:

Unit Test, Daily Observation, Verbal Questions

## **Cabinetmaking II: Power Tools**

Power tools are a more advanced in technology than hand tools. Power tools are a vital part of the cabinetmaking industry because they make working in the industry easier and faster. Knowing how to operate each of the power tools safely will provide you will great skills that will be with you throughout a lifetime. Power tools are the most common type of tools used in any industry.

### **Essential Questions:**

1. How often will you use power tools while working in the shop?
2. Are there still craftsman who still do everything by power tools and hand tools?
3. How long have the power tools that we use in our shop been around?
4. Who are the manufactures that produce the highest quality of power tools?
5. What are the main safety risks while using power tools?
6. Why is it important to know advanced techniques when using power tools?

### **Standards:**

CM1.1 – Apply hand/power tool and lab safety

### **Content/Activities:**

- The students will comprehend the correct names of all the power tools in the shop.
- The students will comprehend the correct application of all the power tools in the shop.
- The students will demonstrate the safe operation of all the power tools in the shop.
- The students will identify the correct storage area for each of the power tools in the shop.
- The students will be familiar with the history of power tools.
- The students will be able to identify hazards involved when working with power tools.
- The students will be able to identify advanced techniques for using power tools.

### **Assessment:**

Unit Test, Visual Observation

## **Cabinetmaking II: Safety**

Safety is one of the most valuable lessons you can learn. There is a big risk when working in a shop environment. We will train you to work safely in the shop. If you will follow all of the rules and procedures for the shop environment you will be able to work safely in the shop.

### **Essential Questions:**

1. What does MSDS mean?
2. What is OSHA and is it helpful?
3. Who is responsible for shop safety?

### **Standards:**

- CM1.1 – Apply hand/power tool and lab safety
- CM1.2 – Identify basic first aid procedures in emergency situations.

### **Content/Activities:**

- The students will research an aspect of safety and present it.
- The students will comprehend the dangers associated with working in the shop.
- The students will identify different injuries that have occurred in the shop environment.
- The students will demonstrate the safe practices while working in the shop.
- Students will be able to apply basic first aid while working in the shop.
- The students will be able to comprehend the acronyms and symbols associated with safety.
- The students will be able to identify the different types of fire extinguishers.

### **Assessment:**

Unit Test, Daily Observation

# Cabinetmaking II: Stationary Machines

Stationary Machines are a necessary part of the cabinetmaking industry. Knowing how to run the machine correctly and safely will give you an advantage when applying for a job in the industry. Understanding the correct principles and theories in how the machines work will enable you to use each of the machines safely.

## Essential Questions:

1. How often will you use stationary machines while working in the shop?
2. Why would craftsman decide not to use stationary machines when building?
3. How long have the stationary machines that we use in our shop been around?
4. Who are the manufactures that produce the highest quality of stationary machines?
5. What are the main safety risks while using stationary machines?
6. Why is it important to know advanced techniques when using stationary machines?

## Standards:

CM1.1 – Apply hand/power tool and lab safety

## Content/Activities:

- The students will comprehend the correct names of all the stationary machines in the shop.
- The students will comprehend the correct application of all the stationary machines in the shop.
- The students will demonstrate the safe operation of all the stationary machines in the shop.
- The students will be familiar with the history of stationary machines.
- The students will be able to identify hazards involved when working with stationary machines.
- The students will be able to identify advanced techniques for using stationary machines.

## Assessment:

Unit Test

## **Cabinetmaking II: Wood Joints**

Being able to identify and make the commonly used wood joints is necessary for working in the cabinetmaking industry. It is necessary to know the commonly used wood joints when doing hobby work or while working on your home. It is necessary to understand each of the wood joints so that you can fix wood joints when they fail in a furniture piece you own.

### **Essential Questions:**

1. Why are advanced joints better than common joints?
2. How do you decide which wood joint to use for your project?
3. When would you use an advanced wood joint?
4. Why is it important for you to know the correct applications for each wood joint?
5. What joints are used when working with the two main styles of cabinets?

### **Standards:**

- CM 2.1 Select variations of cabinets.
- CM 3.2 Illustrate the construction of the project

### **Content/Activities:**

- The students will be able to identify all of the wood joints.
- The students will be able to identify appropriate applications for each wood joint.
- The students will be able to produce each of the wood joints.
- The students will be able to comprehend advanced styles and techniques used in the cabinetmaking industry.

### **Assessment:**

Unit Test, Daily Observation, Check list