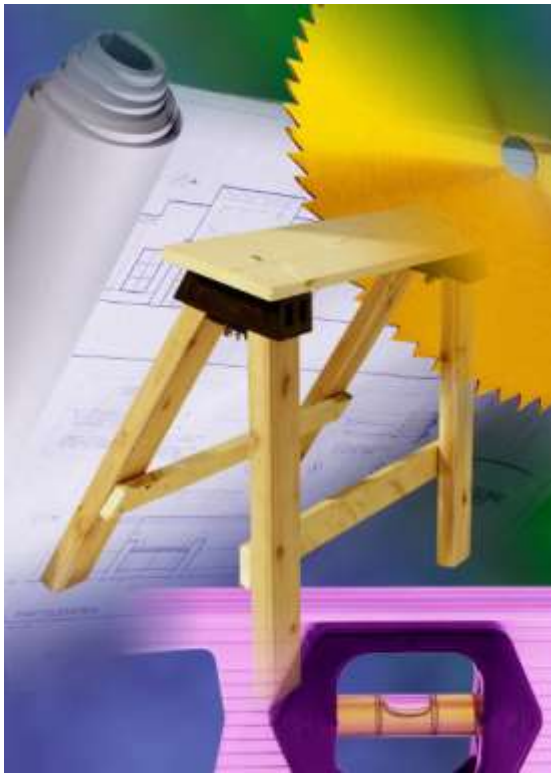
HOMER COMMUNITY SCHOOL DISTRICT

Industrial Technology Education

Curriculum Report

May 21, 2012



PHILOSOPHY OF INDUSTRIAL TECHNOLOGY EDUCATION

It is the philosophy of Homer Community Schools Industrial Technology Department to incorporate career readiness into our curriculum in order to prepare our students to make educated choices toward the next step of employment or to begin a college career which will lead to future employment. Homer School's career ready individuals will understand that their educational choices will lead to future career potential. Our career ready students will become responsible leaders and skilled employees providing valuable talents to future employers.

7-12 ITE CURRICULUM
SUMMARY OF COURSE WORK

7TH GRADE TECHNOLOGY EDUCATION-REQUIRED (NINE WEEKS)

This is an exploratory course for all students in 7th grade. Students will study general safety, hand tool safety and identification as well as power tool safety. Students are introduced to different areas of transportation and communication technology. Each student is required to design and construct three transportation projects and submit a two page research paper. The first project will be a Delta Dart Airplane and will be constructed using Balsa Wood, Paper and will be powered by a Propeller. The next project will be a Hot Air Balloon designed using the traditional five-step design process and sketching. The third CO2 racecar will utilize and the five step design process also. Basic hand and power tool usage is taught with emphasis on safety.

8th GRADE TECHNOLOGY EDUCATION-REQUIRED (NINE WEEKS)

This is an exploratory course for all 8th graders. Students will study general safety, hand tool safety and identification as well as power tool safety. Transportation and Mass Production are the areas of emphasis. Students are introduced to rocketry and mass production technology. Each student is required to research the rocketry field and write a two page research report on their findings. Students then study rocketry in class to prepare for the construction and launch of a rocket of their choice. The mass production unit studies the effect that mass production has on society and the importance of mass production in nearly every industrial workplace. Students then participate in a mass production project in which they construct their own Mantle Clock using jigs and fixtures to assure tolerance levels and safe operation of equipment. Primary concern is the study of safe work habits and safe operation of equipment.

CABINET/FURNITURE MAKING -ELECTIVE (2 SEMESTERS)

Each student is required to utilize the five step design process to design, draft and construct a hardwood furniture project of their choice. Students will learn sketching concepts, orthographic projection (3 view Drafting), scaling, line weight and line types. Students will also study general safety, hand tool safety and power tool safety prior to designing their

project. Woodworking concepts and construction practices will be covered prior to beginning construction of a hardwood furniture project. The difficulty level of these projects must provide a challenge to the individual constructing them. The skill level will be approved by the instructor. Emphasis on safety and proper safety practices are to be demonstrated at all times throughout the course.

ARCHITECTURAL DRAFTING AND DESIGN (2 SEMESTERS)

Students will acquire the basic understanding regarding the planning of various types of residential dwellings. Students will study residential styles as well as information necessary for planning various types of dwellings using traditional as well as 3D computer aided drafting methods. Students will also study construction principals and methods. The necessary communication skills and technical skills will be developed to communicate architectural ideas in an understandable efficient and accurate manner. Each student will individually create working drawings using computer aided software and computer based methods. They will develop technical skills necessary to communicate architectural ideas in an understandable efficient and accurate manner.

WELDING/METALS-ELECTIVE (1/3 SEMESTER)

The welding and metals curriculum studies the following welding processes: Oxyacetylene, AC Arc, MIG, TIG, Aluminum Welding and Plasma Cutting. Also incorporated are brazing and cutting with the oxy-acetylene process. Students are required to complete a minimum of 40 various welds and welding joints, demonstrating skills in all of these areas. After completion of the required welding, students must then sketch and construct a small metals project or a plasma cutting project of their choice. Emphasis on safety and proper safety practices are to be demonstrated at all times throughout the course.

MECHANICS-ELECTIVE (1/3 SEMESTER)

The Mechanics curriculum is structured around the theory and operation of the small internal combustion engine. The first four weeks of the course is lecture and demonstration based dealing with the complete study of the single cylinder internal combustion engine. Students will study lab safety, tools and measurement instruments, fasteners, sealants, gaskets, and principles of operation. The five systems of operation will be studied as well as complete maintenance and service. The remaining nine weeks will be lab oriented and the students will work with a partner. Each pair is required to complete two small engine overhauls, complete with specifications of all parts. Emphasis on safety and proper safety practices is demonstrated at all times throughout the course.

ELECTRICITY/ ELECTRONICS-ELECTIVE (1/3 SEMESTER)

The Electricity Electronics course curriculum includes studies of static electricity, electronic

circuits, schematic diagrams, D.C., and A..C. fundamentals, basic electronic devices, power supplies, electromagnetism, amplifiers, integrated circuits, basic transistor theory, and the use of VOM meters. CES ED LAB training stations are used to provide students a practical application of the theories they have studied.

Students will also study Residential Electrical Wiring and Residential Circuits. Students are required to wire circuit breakers and various residential circuits using switches, receptacles and lighting fixtures. Emphasis on safety and proper safety practices is demonstrated at all times throughout the course.

PROGRAM DAILY OUTLINE

1st hour : Athletic Director
2nd hour : ITE Tech (7th grade) / Planning hour
3rd hour : ITE Tech (8th grade) / Planning hour
4th hour : Cabinetry / Furniture Making
5th hour : Cabinetry / Furniture Making
6th hour : Architectural Drafting / Design
7th hour : Welding / Electronics Electricity / Small Engine Mech.
8th hour : Athletic Director

VARIATIONS FROM COURSE OF STUDY

Field trips:

The Architectural Drafting class travels to Dakota Dunes or Whispering Creek as well as the Sioux City Home Show. Students will observe various architectural designs and building concepts. Students will also be given opportunities to visit on site local construction when it is available.

The Welding / Electronics / Mechanics class travels to Career Day at the Qwest Center to gain exposure to the Technical and Community College opportunities.

7-12 General / Course Objectives

General Objectives:

1. The learner will develop an understanding of technology and how it affects today's society.
2. The learner will develop an awareness of new technologies and the importance of the study of new technologies and how they affect our future.
3. The learner will develop orderly and complete methods of the performance of tasks.
4. The learner will develop the ability to cooperate with others in group activities.
5. The learner will develop self-confidence and pride in personal ability.
6. The learner will develop self-reliance in solving practical problems.
7. The learner will develop knowledge and use of safe work habits.

7th Grade Technology

Specific Objectives:

1. The learner will develop an awareness of the importance of general safety practice in all areas of industrial technology education.
2. The learner will demonstrate knowledge of hand woodworking tools and their safe operation.
3. The learner will demonstrate the knowledge of woodworking hand power tools and their safe operation.
4. The learner will demonstrate the knowledge and safe operation of four of the major stationary power tools used in the construction of the course core projects.
5. The learner will understand the principles of flight and forces affecting flight.
6. The learner will construct and fly a model airplane.
7. The learner will understand the principles of lighter than air flight technology.
8. The learner will construct and fly a scale model balloon of tissue paper.
9. The learner will understand the history, types and uses of lighter than air craft.
10. The learner will understand the US standard system of measurement.
11. The learner will understand the metric system of measurement and appreciate its worldwide importance.
12. The learner will demonstrate knowledge of the five step design process.

13. The learner will construct a C02 powered race car using metric measurement, hand and power tools.
14. The learner will understand and demonstrate the sanding and preparation steps necessary for painting.
15. The learner will demonstrate knowledge of the painting and finishing process.

General Objectives:

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3. The learner will develop orderly and complete methods of the performance of tasks.
4. The learner will develop the ability to cooperate with others in group activities.
5. The learner will develop self-confidence and pride in personal ability.
6. The learner will develop self-reliance in solving practical problems.
7. The learner will develop knowledge and use of safe work habits.

8th Grade Technology

Specific Objectives:

1 The learner will develop an awareness of the importance of general safety practice in all areas of industrial technology education.
2. The learner will demonstrate knowledge of hand woodworking tools and their safe operation.
3. The learner will demonstrate the knowledge of woodworking hand power tools and their safe operation.
4. The learner will demonstrate the knowledge and safe operation of four of the major stationary power tools used in the construction of the course core projects.
5. The learner will understand the principles of model rocket technology.
6. The learner will construct and fly a scale model rocket.
7. The learner will understand the history, types and uses rocketry.
8. The learner will understand mass production and appreciate its worldwide importance.
9. The learner will understand 2 dimensional project planning.
10. The learner will be able to read and comprehend the English Standard Measurement.
11. The learner will demonstrate knowledge of the mass production process.
12. The learner will understand the importance of the jig and fixture in the mass production process.
13. The learner will understand the importance of precision and tolerances.
14. The learner will construct a project using the mass production process.
15. The learner will understand and demonstrate the sanding and preparation steps necessary for staining and varnishing.
16. The learner will understand the fastening process used in woodworking and the importance of proper fasteners.
17. The learner will demonstrate knowledge hardwood finishing processes.

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2. The learner will develop an awareness of new technologies and the importance of the study of new technologies and how they affect our future.
3. The learner will develop orderly and complete methods of the performance of tasks.
4. The learner will develop the ability to cooperate with others in group activities.

5. The learner will develop self-confidence and pride in personal ability.
6. The learner will develop self-reliance in solving practical problems.
7. The learner will develop knowledge and use of safe work habits.

Furniture and Cabinet Making

Specific Objectives:

1. The learner will develop an awareness of the importance of general safety practice in all areas of industrial technology education.
2. The learner will demonstrate knowledge of hand woodworking tools and their safe operation.
3. The learner will demonstrate the knowledge of woodworking hand power tools and their safe operation.
4. The learner will demonstrate the knowledge and safe operation of major stationary power tools used in the construction of the course projects.
5. The learner will demonstrate understanding and use of the English standard unit of measurement.
6. The learner will demonstrate common sketching techniques.
7. The learner will demonstrate and understand the scaling method used to draft their hardwood project.
8. The learner will demonstrate knowledge of orthographic projection.
9. The learner will be able to identify several hardwoods and softwoods and veneers.
10. The learner will demonstrate knowledge of common wood joints.
11. The learner will demonstrate common gluing and clamping techniques.
12. The learner will understand and demonstrate the fastening process used in woodworking and the importance of proper fasteners.
13. The learner will be able to calculate project material to the nearest board foot.
14. The learner will be able to calculate project expense based on board feet.
15. The learner will be able to determine the appropriate use of various furniture and cabinet making materials.
16. The learner will demonstrate various cabinet and furniture making techniques.
17. The learner will demonstrate knowledge hardwood finishing processes.

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3. The learner will develop orderly and complete methods of the performance of tasks.
4. The learner will develop the ability to cooperate with others in group activities.
5. The learner will develop self-confidence and pride in personal ability.
6. The learner will develop self-reliance in solving practical problems.
7. The learner will develop knowledge and use of safe work habits.

Welding

Specific Objectives:

1. The learner will gain knowledge of the history of welding.
2. The learner will demonstrate knowledge of the safety precautions of the oxy-acetylene, shielded metal arc and metallic inert gas welding processes.
3. The learner will demonstrate knowledge of the oxy-acetylene, shielded metal arc, and metallic inert gas welding.
4. The learner will demonstrate safe practices and knowledge of the oxy-acetylene cutting process
5. The learner will be able to properly maintain and care for the equipment used in the welding and cutting processes.
6. The learner will demonstrate their ability to weld in the flat, horizontal and vertical welding positions.
7. The learner will demonstrate their ability to braze using the oxy-acetylene torch.
8. The learner will develop an awareness of the importance of general safety practice in all areas of industrial technology education.
9. The learner will demonstrate knowledge of hand metalworking tools and their safe operation.
10. The learner will demonstrate the knowledge of metalworking power tools and their safe operation.
11. The learner will demonstrate common sketching techniques.
12. The learner will demonstrate and understand the scaling method used to draft their welding project.
13. The learner will demonstrate knowledge of orthographic projection.
14. The learner will demonstrate knowledge of the preparation and painting process for metal.

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6. The learner will develop self-reliance in solving practical problems.
7. The learner will develop knowledge and use of safe work habits.

Small Engine Mechanics

Specific Objectives:

1. The learner will develop an awareness of the importance of general safety practice in all areas of industrial technology education.
2. The learner will demonstrate knowledge of small engine tools and their safe operation.
3. The learner will demonstrate the knowledge of small engine hand power tools and their safe operation.
4. The learner will demonstrate the knowledge and safe operation of major stationary power tools used in the repair and overhaul of the course projects.
5. The learner will be able to demonstrate measuring techniques of small engine parts.
6. The learner will be able to repair threads, identify and install fasteners correctly.
7. The learner will be able to remove and install gaskets.
8. The learner will be able to identify the basic components of a small engine and describe the function of each part.
9. The learner will be able to identify the basic differences between two-cycle and four - cycle engines.
10. The learner will understand the principles of engine performance and how it is measured.
11. The learner will demonstrate understanding of fuel and emission control systems.
12. The learner will be able to list and explain the principles of the fuel system.
13. The learner will be able to describe the operation and purpose of magneto and solid state ignition systems.
14. The learner will understand the importance of lubrication systems and the role they play in reducing maintenance and cost of operation.
15. The learner will gain knowledge of cooling systems and the importance of proper cooling system maintenance.
16. The learner will be able to troubleshoot and inspect small engines, disassemble and recondition and/or replace engine blocks, internal and external parts.

General Objectives:

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4. The learner will develop the ability to cooperate with others in group activities.
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7. The learner will develop knowledge and use of safe work habits.

Architectural Drafting and Design

Specific Objectives:

1. TLW = Identify historical influences of today's homes.
2. TLW = Recognize basic house designs.
3. TLW = Understand primary considerations prior to construction.
4. TLW = Discuss important factors concerning room planning.
5. TLW = Identify and draft the various features of a plot plan.
6. TLW = Design footings and foundations for a house plan.
7. TLW = Recognize and draft sill and floor construction.
8. TLW = Recognize and draft wall and ceiling construction.
9. TLW = Gain knowledge of door and window style and drafting techniques.
10. TLW = Discuss and design a stairway for a residential structure.
11. TLW = Compare various fireplaces for modern residences.
12. TLW = Design and draw a residential floor plan.
13. TLW = Describe and draw a typical framed roof.
14. TLW = Draw a typical exterior elevation.
15. TLW = Create window and door schedules for a typical residence.
16. TLW = Create a electrical floor plan.
17. TLW = Explain applications of new products and construction methods.
18. TLW = Study advantages and disadvantages of modular construction.
19. TLW = Utilize Chief Architect 3D Solid Modeling Software.
20. TLW = Set floor defaults for a standard residential structure
21. TLW = Draw walls for a standard residential structure
22. TLW = Create dimension lines and interpret their information data.
23. TLW = Manipulate wall positions
24. TLW = Create rooms and view them in 3D.
25. TLW = Add floors, stairs and a roof as well as manipulate their size and shape.
26. TLW = Draw beams and structural members to add support.
27. TLW = Place doors and windows with the structure.
28. TLW = Control the display of objects within the library of objects.
29. TLW = Add electrical symbols to all floors of the plan.
30. TLW = Apply room moldings and wall coverings.
32. TLW = Change materials utilizing material modification tools within the software.
33. TLW = Add kitchen cabinets, appliances, custom counters and material coverings.
34. TLW = Edit the Terrain Perimeter by editing grade and elevations.
35. TLW = Add a retaining wall to the terrain.

36. TLW = Add exterior plantings and exterior objects to enhance the drawing set.
37. TLW = Add exterior decks, stairs and furniture.
38. TLW = Create a walkout basement after creating the appropriate terrain elevations.
39. TLW = Create a concrete patio and driveway.
40. TLW = Create a Layout Template for printing.
41. TLW = Create a Boarder and Title Block.
42. TLW = Prepare all drawing for printing and presentation.

General Objectives:

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7. The learner will develop knowledge and use of safe work habits.

Electronics/Electricity (Residential Wiring)

Specific Objectives:

1. TLW = Become familiar with general safety procedures in electronics.
2. TLW = Learn the fundamentals of atoms and electrons.
3. TLW = Understand electric current and how it is produced.
4. TLW = Learn the physical appearance, schematic symbol and basic function of electronic components.
5. TLW = Learn the resister color code.
6. TLW = Make a complete inventory of electronic parts required for the course.
7. TLW = Learn what an Electronic Circuit is.
8 . TLW = Understand the relationship between Current Voltage and Resistance.
9 . TLW = Learn how to draw and read schematic diagrams.
10. TLW = Demonstrate how to use an electronic VOM Multimeter.
11. TLW = Understand the fundamentals of AC and DC current.
12. TLW = Develop an understanding of Transistors and their function.
13. TLW = Learn the function of Silicon Controlled Rectifiers and Alarm Systems.
14. TLW = Demonstrate the function of Diodes in DC Circuits.
15. TLW = Construct resistor circuits and evaluate their function.
16. TLW = Learn the function of Capacitors in AC and DC circuits.
17. TLW = Understand the function of Variable Resistors.
18. TLW = Build and evaluate Resistance Capacitance Timing Circuit.
19. TLW = Simulate the Auto Delay Circuit on an Automobile.
20. TLW = Understand Current and Voltage when using AC.
21. TLW = Successfully operate an AC Function Generator.
22. TLW = Understand Diode Rectification and construct a Diode Rectifier Circuit.
23. TLW = Understand Step Up and Step Down Transformers
24. TLW = Learn what a Transformer is and its function.
25. TLW = Simulate a Lamp Dimmer System and understand its operation.
26. TLW = Learn the function of an Audio Amplifier.
27. TLW = Understand to function of a Transistor Amplifier.
28. TLW = Simulate an Operational Amplifier
29. TLW = Construct a simple Power Amplifier.
30. TLW = Build a Lamp Flasher and understand its function.
31. TLW = Construct a Sound Oscillator and evaluate is function.
32. TLW = Simulate a Public Address System and evaluate its function.
33. TLW = Utilize the tools necessary to perform Residential Wiring Techniques.
34. TLW = Understand Conductors and their Gage indications for Residential Wiring.

35. TLW = Understand how Electricity energizes a home.
36. TLW = Understand the function of a home Service Entrance Panel.
37. TLW = Learn how to change a Service Entrance Panel Circuit Breaker.
38. TLW = Understand Branch Circuits and maximum loads.
39. TLW = Construct Simple Circuits in Series.
40. TLW = Construct Simple Circuits n Parallel.
41. TLW = Construct a Switch Loop Circuit with Receptacles.
42. TLW = Construct Three Way Switching Circuits with Receptacles.