Industrial Technology Curriculum
Grades 7 - 12
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District Mission

The School District of the City of St. Charles believes that teaching and learning are the two most important activities that occur in our community. Our mission is to provide the care, leadership, and instructional skills necessary to ensure that effective learning occurs for each student.

District Vision

The City of St. Charles School District will be an educational leader recognized for high performance, academic excellence, and students prepared for a changing tomorrow.

District Values

We, the City of St. Charles School District community of students, parents, staff, and patrons, value:

High quality education for all students within a sage and nurturing environment which includes:
- Lifelong learning from early childhood through adult education
- Learning experiences that challenge all students academically
- Instruction that meets the needs of each learner
- Respect for diversity
- Real world problem-solving skills
- Preparation for an ever-changing, global, technological society
- Developing thoughtful, productive, and responsible citizens
- Parent and community partnerships
- Exploration, innovation, and creativity

Achievement through:
- A “Success for All” philosophy
- By working together in professional learning communities

The classroom teacher as the most important resource for student learning by:
- Hiring and retaining highly qualified staff members
- Providing professional development and collaboration focused on increasing student achievement

Informed decisions that are:
- Student-centered
- Focused on student achievement
- Data Driven
- Considerate of all points of view
- Fiscally responsible
District Goals

For planning purposes, five overarching goals have been developed. These goals are statements of the key functions of the school district.

1. **Student Performance**
   - Develop and enhance the quality educational/instructional programs to improve student performance and enable students to meet their personal, academic, and career goals.

2. **Highly qualified staff**
   - Recruit, attract, develop, and retain highly qualified staff to carry out the District’s mission, vision, goals and objectives.

3. **Facilities, Support, and Instructional Resource**
   - Provide and maintain appropriate instructional resources, support services, and functional and safe facilities.

4. **Parent and Community Involvement**
   - Promote, facilitate and enhance parent, student, and community involvement in district educational programs.

5. **Governance**
   - Govern the district in an efficient and effective manner providing leadership and representation to benefit the students, staff, and patrons of the district.

School District Philosophical Foundations

Teachers in the School District of the City of St. Charles share in and ascribe to a philosophy that places children at the heart of the educational process. We feel that it is our professional responsibility to strive to be our best at all times and to maximize our efforts by ensuring that the following factors are present in our classrooms and our schools.

1. Learning is developed within the personal, physical, social, and intellectual contexts of the learner.
2. A strong educational program should provide developmental continuity.
3. The successful learner is motivated, strategic, knowledgeable, and interactive.
4. Children learn best when they have real purposes and can make connections to real life.
5. Effective learning is a combination of student exploration and teacher and mentor modeling.
6. Assessment is an ongoing and multidimensional process that is an integral part of instruction.
7. Making reading and writing connections across multiple sources and curricula facilitates meaning.
8. Literacy for the future means literacy in multiple technologies.
9. Education must respond to society’s diverse population and serve all children.
10. Interactions among students, teachers, parents, and community form the network that supports learning.
Course Descriptions

Seventh & Eighth Grade Industrial Technology Curriculum:

**General Industrial Technology** program is an 18 week course exploring industrial technology. The curriculum revolves around three major areas of study: communication, production, and transportation. This program responds to the needs of all students undergoing rapid physical, emotional, social, and intellectual growth of this middle school age group. This course is designed to provide active learning situations in technology emphasizing problem solving, creativity, and cooperation.

High School Industrial Technology Curriculum:

**Graphic and Electronic Media** - Graphic and Electronic Media is an introduction to many different technologies. Fun, interactive learning tools help promote science, technology, engineering, and math. This class offers design, visualization, and simulation capabilities so students can easily move between 2D and 3D design environments, and fully experience their creative ideas digitally. The possibilities of software applications the students will be introduced to are engineering, architectural, video editing & special effects, sign making, laser engraving, and many others. For further explanation see the Industrial Technology instructor. The lab fee covers materials for projects done in class. Credit may transfer toward a certificate or associate’s degree at St. Charles Community College.

**Transportation Systems** - Students will receive basic instruction in the technological principles of power and energy transmission; internal combustion engines; engineering principles for land and water transportation; forces on land and water transportation. Careers in related technologies will also be studied. Students who are considering enrolling in any of the automotive programs at Lewis Clark Career Center should consider enrolling in Transportation Systems as a freshman or sophomore. The lab fee covers materials for projects done in class.

**Design & Machine Processes** - Both boys and girls can learn the basic procedures for using common hand tools, portable power tools and industrial grade material processing tools. Each student is required to wear safety glasses in the lab. Problem solving and decision making is a key component of this class. First semester is reserved for learning safety procedures, materials, and hand and power equipment through bookwork, lecture and producing an instructor designed project. Second semester students will develop and produce a project of their own design.

**Architectural Drafting & Design** - Following standard building practices each student will apply his/her drafting skills to design and develop a set of working drawings for a residential structure. These drawings will include; floor plans, electrical plans, plumbing plans, plot plans, and elevations. This class is an introduction for those who are considering careers in the fields of architecture, structural engineering, interior design, construction, or the housing industry.
Mechanical & Computer Aided Drafting - It is important for all students to understand drawings. This course would allow students to read and draw technical drawings. This class is a great lead into the Drafting Courses offered at Lewis and Clark Technical School. Mechanical and Computerized Drafting is divided into mechanical drafting (board drafting) and CADD (Computer Aided Drafting and Design). A general introduction to drafting will be taught through different drafting tools, geometric construction, multi-view drawings and pictorials. A more detailed instruction with computers will include drawings, auxiliary views, and sectional views, along with gears and threads. All drawings on computers will be plotted with available plotters. Credit may transfer toward a certificate or associate’s degree at St. Charles Community College.

Home Repairs - Home Repairs provides the basic information needed to understand and use hand tools, power tools, fasteners, and assorted building material for the repair and maintenance of your future home. You will gain knowledge of the structure of a home and the skills and techniques used in carpentry, plumbing, electricity, and other building trades. Proper maintenance of all housing systems will be stressed to prevent costly repairs. The lab fee covers a variety of materials for projects done in class.

Advanced Technological Solutions - This is a lab class in which the student, on an individual basis, chooses from a variety of projects in the technological fields. These include, but are not limited to: (CNC) Computer Numerical Control, video production, computer editing, graphic illustration-publishing, Landscape Design, CAD-architectural design, CAD-industrial design, 3-Dimensional Design Software and commercial illustration. While in this class students will learn a variety of principles in order to work successfully and establish a quality foundation for college courses in the different technological fields.

Advanced Design & Machine Processes - This is an advanced lab class in which the student chooses from a variety of projects on an individual basis. These include, but are not limited to: woodworking, school improvement projects, maintenance, landscaping, and building. About 95% of the student grade will be based upon the actual construction of a series of projects. There are no specific required projects. Students are to design and construct a project(s) of their own choosing. The total cost for the course will depend upon the amount of materials used. Students are required to pay for the materials to complete each project. (The exception is when unless it is a school improvement project).
7-12 Industrial Technology Rationale

The Industrial Technology Program of the School District of the City of St. Charles offers a diverse program of developmental, sequential and creative learning experiences common to the industrial world of work. This program enhances each student’s self-esteem, eagerness to learn, and intellectual curiosity. The natural approach to industrial technology instruction considers the continual evolution reflected by constant and rapid changes inherent in modern industry. The Industrial Technology Program illustrates the practical applications of our districts core subjects. There is a firm professional commitment by the teaching staff to stay abreast of these changes and to implement current teaching approaches and technologies within the industrial technology field.

Industrial Technology Class Rationales

The middle school technology curriculum is designed to provide a foundation of basic skills and knowledge in this progressively technical world. It will introduce, develop, and support students in the designated competencies as described in the units of study that will support various curricula. Students will acquire technical skills, learn how to apply their knowledge, and use creativity in their work.

The rationale behind the Graphic and Electronic Media is to introduce students to several different areas of graphic design communications. Some of the fields the students will be introduced to include, but are not limited to, are architectural design, mechanical design, animation, and video production. This class develops a foundation which leads to higher levels of exploration in these design fields.

The rationale behind the Transportation Systems class is to introduce students to some basic engineering principles dealing with the transportation industries. These industries include, but are not limited to, ground, water, and air transportation. This class gives the students and understanding of how energy and power play a role in all areas of transportation.

The rationale behind the Design & Machine Processes class is to give students the opportunity to understand and develop basic skills and techniques in the machine processes and Industry trades. These skills include, but are not limited to, the design process and the use of power and hand tools. This class lays down a foundation for further exploration of these skills and techniques in advanced courses.

The rationale behind the Architectural Drafting & Design class is to introduce students to the field of architectural design. Students will gain knowledge and hands on experience in the development of an architectural set of plans by using the appropriate use of building codes. This class lays down a foundation for further exploration of these skills and techniques in advanced courses.

The rationale behind the Mechanical & Computer Aided Drafting class is to introduce students to the field of engineering design. Students will gain knowledge and hands on experience in the development of a set of working drawings by using the appropriate tolerances and design sets. This class lays down a foundation for further exploration of these skills and techniques in advanced courses.
The rationale behind the Home Repairs class is to give students the opportunity to understand and develop basic skills and techniques in the area of home repairs and maintenance. These skills include, but are not limited to, the design process, construction fields and the use of power and hand tools. This class lays down a foundation for further exploration of these skills and techniques in advanced courses.

The rationale behind Advanced Technological Solutions is to allow students to further their knowledge from Mechanical Drafting, Architecture, and GEM. This allows students to use higher order thinking skills when developing and evaluating their projects. With this class students have the opportunity to understand and develop advanced skills and techniques in the engineering, architecture, and computer graphics fields.

The rationale behind Advanced Solutions in Design & Machine Processes is to allow students to further their knowledge from both Home Repairs and Design and Machine Processes. This allows students to use higher order thinking skills when developing and evaluating their projects. With this class students have the opportunity to understand and develop advanced skills and techniques in the machine processes and industry trades.
Essential Understandings

7th & 8th Grade Industrial Technology

Students will:
1. Increase each student’s safety awareness while using tools and machines.
2. Allow students to function in a natural and realistic setting with regard to the world of work through hands on activities.
3. Increase each student’s awareness of various career opportunities related to Industrial Technology education.
4. Develop each student’s visual communication skills.
5. Strengthen each student’s math, science and English skills while enriching his/her history knowledge.
6. Help increase each student’s desire to learn.

Graphic and Electronic Media

Students will:
1. Gain knowledge in the areas of 2-Dimensional Design, 3-Dimensional Design, rendering and Animation.
2. Will be introduced to the fields of engineering, architecture, and graphic communication design.
3. Apply the skills acquired in math, reading, writing, and science to industrial technology.
4. Learn the steps of transitioning from 2D to 3D and producing a completed computer designed product.
5. Employ the problem solving process to reach technical solutions through computers and technology activities.

Transportation Systems

Students will:
1. Develop a knowledge base of transportation systems that are used in everyday lives.
2. Explain how different transportation systems interlace with each other.
3. Describe the role of transportation in our society.
4. Employ the problem solving process to reach technical solutions through hands on activities.
5. Apply the skills acquired in math, reading, writing, and science to industrial technology.

Design & Machine Processes

Students will:
1. Gain knowledge of the types of work activities associated with manufacturing.
2. Obtain a knowledge of the building and mechanical systems in manufacturing.
3. Gain exploratory experiences in activities related to manufacturing.
4. Read, interpret, or make simple sketches that are descriptive of objects and activities to be manufactured.
5. Select wisely, care for, and use properly and safely, the various tools and materials that are used in the manufacture of a product.
6. Demonstrate work habits and attitudes that will enable students to live as productive citizens in society.

**Architectural Drafting & Design**

Students will:
1. Demonstrate the ability to effectively convey an idea using selected drafting and design techniques.
2. Demonstrate an ability to use proper nomenclature associated with graphic and electronic drafting and design equipment.
3. Describe the role of computers as they are used in various technical drawings and designs.
4. Employ the problem solving process to reach technical solutions.
5. Apply the skills acquired in math, reading, writing, and science to industrial technology.

**Mechanical & Computer Aided Drafting**

Students will:
1. Gain knowledge of the types of work activities associated with manufacturing.
2. Obtain a knowledge of the building and mechanical systems in manufacturing.
3. Gain exploratory experiences in activities related to manufacturing.
4. Read, interpret, or make simple sketches that are descriptive of objects and activities to be manufactured.
5. Select wisely, care for, and use properly and safely, the various tools and materials that are used in the manufacture of a product.
6. Demonstrate work habits and attitudes that will enable students to live as productive citizens in society.

**Home Repairs**

Students will:
1. Gain knowledge of types of work activities associated with the home.
2. Obtain a knowledge in the building and mechanical systems dealing with residential construction.
3. Gain exploratory experiences in activities relating to home repairs.
4. Read, interpret, or make simple sketches that are descriptive of objects and activities to be constructed or repaired in the home.
5. Select wisely, care for, and use properly and safely, the various tools and materials that would be used in the repair and maintenance of the home.
6. Demonstrate work habits and attitudes that will enable students to live as a productive, cooperative, and intelligent consumer of skills and services provided by the construction and maintenance trades.

7. Demonstrate consumer knowledge and appreciation of the workmanship, tools, materials, and design of products in the home.

**Advanced Technological Solutions**

Students will:

1. Gain knowledge in advanced techniques and procedures in CNC programming, graphic design, 3D solid modeling, 2D engineering drawings, and architectural drawings.
2. Gain knowledge in the use of user interfacing and command manager controls.
3. Demonstrate knowledge in the development of part, assembly, and drawing documents.
4. Gain exploratory experiences in various fields including, but not limited to 3D drawings into 2D drawings, part invention, design, assembly and production.
5. Demonstrate skills with importing and exporting .dwg, .sldprt., sldasm., and slddrw. files.
6. Demonstrate organizational skills when developing part files, part lists, design trees, design libraries, and other miscellaneous resources.
7. Demonstrate work habits and attitudes that will enable students to live as a productive, cooperative, and intelligent consumer of skills and services provided by the various technological fields.

**Advanced Design & Machine Processes**

Students will:

1. Gain knowledge and demonstrate advanced techniques and procedures in woodworking, school improvement projects, maintenance, landscaping, and building.
2. Gain knowledge and demonstrate the planning and preparation of bills of material, stock cutting list, cutting diagrams, and other associated costs.
3. Demonstrate knowledge in the appreciation of craftsmanship, materials, tools and construction of various projects.
4. Demonstrate work habits and attitudes that will enable students to live as a productive, cooperative, and intelligent consumer of skills and services provided by the construction and maintenance trades.
Industrial Technology Department Program 7-12 Goals

Goal 1: Understanding of the major technological systems and their key concepts and interactions.

- Analyzing current and emerging technological systems to determine their structure, composition and processes;
- Selecting and using appropriate technological tools and systems to address basic needs and/or extend human capabilities;
- Understanding and applying key components, subsystems, materials/processing systems;
- Applying and reinforcing mathematics, science, language arts, the social sciences, the fine arts and other disciplines through analysis, design use and evaluation of technological systems.

Goal 2: An ability to apply generalized and specific technological procedures.

- Demonstrating safe, effective and creative use of resources by individuals or groups in performing general (e.g., engineering, problem-solving…) and specific (construction, transmitting, testing…) technological procedures;
- Selecting and using tools, materials and processes appropriate to each stage in technological problem-solving;
- Applying technological procedures to access, process, create, store and communicate information;
- Selecting, processing, recycling and disposing of natural or synthetic materials for application in communication, production and transportation;
- Selecting, controlling and applying the energy and power processes in communication, production and transportation.

Goal 3: Understanding of the interactive relationships technology has with society, culture and the environment.

- Interpreting technological changes, trends and their relations to society, culture and the environment;
- Identifying and analyzing how major technological inventions and innovations have influenced and continue to impact cultural values;
- Understanding ways in which cultural values and societal norms, in a global society, lead to the selection and development of technological innovations;
- Assessing the economic and consumer implications of technological products and procedures;
- Projecting and assessing the effects of alternative technological futures on society, culture and the environment.
# Scope and Sequence

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</table>
7th Grade
Content Area: Industrial Technology
# Course Name:
7th Grade Industrial Technology

# Grade:
7

# Duration of Unit:
12-15 days

## Unit Title:
**Introduction to Technology**

## Learning Objective/Essential Course Outcome:
Students will learn and gain an understanding of various technologies.

## Primary Text: *Introduction To Technology, Alan Pierce / Dennis Karwatka*

<table>
<thead>
<tr>
<th>Equity/Workplace Readiness</th>
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</thead>
<tbody>
<tr>
<td>Equity</td>
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<tr>
<td>Technology</td>
<td>x Workplace Readiness Skills</td>
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<td>x GLEs National Standards</td>
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<td>1.1, 1.2, 1.4, 1.9, 2.7, 3.7, 3.8, 4.5</td>
</tr>
</tbody>
</table>

## Standards

- **Content Standards**: CA 3, 5, 6, MA 2
- **Process Standards**: TES 1, 2, 3, 8, 9, 10, 11

## Guiding Questions

1. What are areas of technology and how is technology used in society?
2. What are some ways in which technology affects people and how do we keep them safe in the shop?
3. What careers are generated from technology and how do does technology balance our society?

## Learning Activity

**Learning Activity**

- Students will: Read Chapter 1 in textbook.
- Watch technology video
- Participate and listen to class lecture and discussion.

## Assessment Activity

**Assessment Activity**

- Students will: Read and/or write a technology research paper.
- Develop a game system and candy jar.

### Evaluation
- Scoring rubric for each project
- Check for understanding through oral discussion and teacher observation

## Resources:
Computer, textbooks, selected websites, projector

## Enrichment Exercises:
Have students use the CADD system using knowledge gained through their first experience to draft a more efficient/original game or candy jar.

## Correction Exercises:
Self-assessment and allow for revision

## Special Needs:
None needed for this unit.
**Course Name:**
7th Grade Industrial Technology

**Grade:** 7

**Duration of Unit:** 12-15 days

**Unit Title:**
Introduction to Communication Technology

**Learning Objective/Essential Course Outcome:**
Students will learn and gain an understanding of various technologies.

**Primary Text:** *Introduction To Technology, Alan Pierce / Dennis Karwatka*

<table>
<thead>
<tr>
<th>Equity/Workplace Readiness</th>
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<tr>
<td>Technology</td>
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<td>Technology</td>
<td>4. Homework &amp; Practice</td>
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<td>5. Nonlinguistic Representations</td>
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<td>6. Cooperative Learning</td>
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<td>7. Setting Objectives &amp; Providing Feedback</td>
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<td>8. Generating &amp; Testing Hypothesis</td>
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<td>9. Cues, Questions, &amp; Advanced Organizers</td>
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<td>10. Other</td>
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</table>

**Standards**

- Content Standards
  - CA 3, 5, 6
  - MA 2

- Process Standards
  - 1.1, 1.2, 1.4, 1.9, 2.7, 3.7, 3.8, 4.5

- GLEs/National Standards
  - TES 1, 2, 3, 8, 9, 10, 11

**Guiding Questions**

- What is communication and how has it evolved?
- What are the different types of communication and how are they used?

**Learning Activity**

- Students will:
  - Read Chapter 5 in Textbook.
  - Watch communication video
  - Participate and listen to class lecture and discussion.

**Assessment Activity**

- Students will:
  - Communication presentation.
  - Use CADD to develop blueprints for a clock
  - Scoring rubric for each project
  - Check for understanding through oral discussion and teacher observation

**Resources:** Computer, textbooks, selected websites, projector

**Enrichment Exercises:** Have students use the CADD system using knowledge gained through their first experience to draft a more efficient/original clock.

**Correction Exercises:** Self-assessment and allow for revision

**Special Needs:** None needed for this unit.
<table>
<thead>
<tr>
<th>Course Name:</th>
<th>Grade:</th>
<th>Duration of Unit:</th>
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<tbody>
<tr>
<td>7th Grade Industrial Technology</td>
<td>7</td>
<td>10-12 days</td>
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</table>

**Unit Title:**
Introduction to Transportation Systems

**Learning Objective/Essential Course Outcome:**
Students will learn various parts of our transportation system and understand their importance in a modern society.

**Primary Text:** *Introduction To Technology, Alan Pierce / Dennis Karwatka*

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<th>Equity/Workplace Readiness</th>
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<td>Technology</td>
<td>Workplace Readiness Skills</td>
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<th>Guiding Questions</th>
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<tr>
<td>What is transportation and how has it evolved?</td>
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<td>What are the different types of transportation systems and what are their basic parts?</td>
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<tr>
<th>Learning Activity</th>
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<tr>
<td>Students will:</td>
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<tr>
<td>Read Chapter 14 in Textbook.</td>
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<td>Watch engineering disasters video</td>
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<td>Participate and listen to class lecture and discussion.</td>
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<th>Assessment Activity</th>
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<tr>
<td>Students will:</td>
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<tr>
<td>Transportation power point presentation.</td>
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<td>Create a car out of paper and dowel rods.</td>
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**Evaluation**
Scoring rubric for each project
Check for understanding through oral discussion and teacher observation

**Resources:** Computer, textbooks, selected websites, projector

**Enrichment Exercises:** Have students rebuild paper cars using knowledge gained through their first experience to make their car faster.

**Correction Exercises:** Self-assessment and allow for revision

**Special Needs:** None needed for this unit.
**Course Name:** 7th Grade Industrial Technology  
**Grade:** 7  
**Duration of Unit:** 10-12 days

**Unit Title:** Introduction to Tomorrow’s Technology

**Learning Objective/Essential Course Outcome:**  
Students will learn and understand how technology is evolving.

**Primary Text:** *Introduction To Technology, Alan Pierce / Dennis Karwatka*

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<td>Process Standards</td>
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<td>GLEs National Standards</td>
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**Guiding Questions**

What is the future of communication and how will it impact our society?

What types of transportation will be around in the future and how will they be powered?

What is the future for construction and how will that impact our society?

**Learning Activity**

Students will:
- Read Chapter 14 in Textbook.
- Watch Future of Technology Video
- Participate and listen to class lecture and discussion.

**Assessment Activity**

Students will:
- Transportation PowerPoint presentation.
- Construct a magnetic levitated racing vehicle.
- Construct a paper rocket.

**Evaluation**

Scoring rubric for each project

Check for understanding through oral discussion and teacher observation

**Resources:** Computer, textbooks, selected websites, projector

**Enrichment Exercises:** Have students rebuild paper cars using knowledge gained through their first experience to make their car faster.

**Correction Exercises:** Self-assessment and allow for revision

**Special Needs:** None needed for this unit.
8th Grade
Content Area: Industrial Technology
### Course Name:
**8th Grade Industrial Technology**

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<th>Grade:</th>
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<td>8</td>
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### Unit Title:
**Introduction to Technology**

### Learning Objective/Essential Course Outcome:
Students will learn about technology and understand its importance to society.

### Primary Text: *Introduction To Technology, Alan Pierce / Dennis Karwatka*

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### Standards

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<td>TES 1, 2, 3, 8, 9, 10, 11</td>
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### Guiding Questions

- What are areas of technology and how is technology used in society?
- What are some ways in which technology affects people and how do we keep them safe in the shop?

### Learning Activity

- Students will:
  - Read Chapter 1 in Textbook.
  - Watch Technology Video
  - Participate in class lecture and discussion.

### Assessment Activity

- Students will:
  - Technology research paper.
  - Develop a tool box and jewelry box.
  - Evaluation
    - Scoring rubric for each project
  - Check for understanding through oral discussion and teacher observation

### Resources:
Computer, textbooks, selected websites, projector

### Enrichment Exercises:
Have students use the CADD system using knowledge gained through their first experience to draft a more efficient/original tool box or jewelry box.

### Correction Exercises:
Self-assessment and allow for revision

### Special Needs:
None needed for this unit.
Course Name: 8th Grade Industrial Technology  
Grade: 8  
Duration of Unit: 10-15 days

Unit Title: **Introduction to Communication Systems**

**Learning Objective/Essential Course Outcome:**
Students will learn and understand various parts of communication technology.

**Primary Text:** *Introduction To Technology, Alan Pierce / Dennis Karwatka*

**Equity/Workplace Readiness** | **Instructional Method (Strategy)**
---|---
Equity | x Research | 1. Identify similarities/differences | x 6. Cooperative Learning
Technology | x Workplace Readiness Skills | 2. Summarizing/Note Taking | 7. Setting Objectives & Providing Feedback

**Standards**
- **Content Standards**
  - CA 3, 5, 6
  - MA 2
- **Process Standards**
  - 1.1, 1.2, 1.4, 1.9, 2.7, 3.7, 3.8, 4.5
- **CLEs National Standards**
  - TES 1, 2, 3, 8, 9, 10, 11
- **Guiding Questions**
  - What is communication and how has it evolved?
  - What are the different types of communication and how are they used?
  - What is electricity and how does it create power?
- **Learning Activity**
  - Students will:
    - Read Chapter 5 in textbook.
    - Watch communication video
    - Participate in class lecture and discussion.
- **Assessment Activity**
  - Students will:
    - Communication presentation.
    - Use *Solid Works* to develop 3D blue prints for a lamp

**Resources:** Computer, textbooks, selected websites, projector

**Enrichment Exercises:** Have students use the *Solid Works* program using knowledge gained through their first experience to draft a more efficient/original lamp.

**Correction Exercises:** Self-assessment and allow for revision

**Special Needs:** None needed for this unit.
Graphic & Electronic Media
Content Area: Industrial Technology
<table>
<thead>
<tr>
<th>Course Name: Graphic and Electronic Media</th>
<th>Grade: 9-12</th>
<th>Duration of Unit: 10-12 days</th>
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</table>

**Unit Title:**

**Introduction to Two Dimensional Design**

**Learning Objective/Essential Course Outcome:**
Students will be introduced to several different areas of graphic design communications. This class develops a foundation which leads to higher levels of exploration in these design fields.

**Primary Text:** *Various Online Software Tutorials*

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<td>5. Nonlinguistic Representations</td>
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**Standards**

- **Content Standards**
  - CA 3, 5, 6
  - MA 2
- **Process Standards**
  - 1.1, 1.2, 1.4, 1.9, 2.7, 3.7, 3.8, 4.5
- **GLEs-National Standards**
  - TES 1, 2, 3, 4, 8, 9, 10, 11, 19

**Guiding Questions**

- What is the purpose of drafting?
- What are some of the basic tools and commands of computer aided design?
- What is orthographic projection?
- What are different views in a set of working drawings?

**Learning Activity**

Students will:

- Utilize CAD tutorials to develop drawings.
- Watch demonstration videos.

**Assessment Activity**

Students will:

- Use AutoCAD to develop orthographic projections.
- Develop a set of working drawings.

**Evaluation**

Scoring guide for each project

Check for understanding through oral discussion and teacher observation

**Resources:** Computer, textbooks, selected websites, projector

**Enrichment Exercises:** Students will complete a schematic of a 2D Floor Plan.

**Correction Exercises:** Self-assessment and allow for revision

**Special Needs:** None needed for this unit
<table>
<thead>
<tr>
<th><strong>Course Name:</strong></th>
<th>Graphic and Electronic Media</th>
<th><strong>Grade:</strong></th>
<th>9-12</th>
<th><strong>Duration of Unit:</strong></th>
<th>10-12 days</th>
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</table>

**Unit Title:**
**Introduction to 3D Mechanical Design**

**Learning Objective/Essential Course Outcome:**
Students will be introduced to several different areas of graphic design communications. This class develops a foundation which leads to higher levels of exploration in these design fields.

**Primary Text: Various Online Software Tutorials**

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<td>x Technology</td>
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<td>TES 1, 2, 3, 4, 8, 9, 10, 11, 19</td>
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</table>

**Guiding Questions**

- What are some of the basic tools and commands of 3D design?
- How do you extrude 2D shapes into 3D parts?
- How do you properly dimension a 3D Part?

**Learning Activity**

Students will:
- Utilize tutorials to develop drawings.
- Watch demonstration videos.
- Class Lecture and Discussion

**Assessment Activity**

Students will:
- Use Inventor to develop 3D Parts.

**Evaluation**

Scoring guide for each project
Check for understanding through oral discussion and teacher observation

**Resources:** Computer, textbooks, selected websites, projector

**Enrichment Exercises:** Students will complete an assembly of multiple parts

**Correction Exercises:** Self-assessment and allow for revision

**Special Needs:** None needed for this unit
### Course Name:
**Graphic and Electronic Media**  
**Grade:** 9-12  
**Duration of Unit:** 10-12 days

### Unit Title:
**Introduction to 3D Architectural Design**

#### Learning Objective/Essential Course Outcome:
Student will introduce students to several different areas of graphic design communications. This class develops a foundation which leads to higher levels of exploration in these design fields.

#### Primary Text: **Various Online Software Tutorials**

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#### Standards

| CA 3, 5, 6 | Process Standards 1.1, 1.2, 1.4, 1.9, 2.7, 3.7, 3.8, 4.5 | TES 1, 2, 3.4, 8, 9, 10, 11,20 | x | 4. Homework & Practice | x | 9. Cues, Questions, & Advanced Organizers |

#### Guiding Questions

- What are some of the basic tools and commands of 3D Architectural design?
- How do you extrude 2D shapes into 3D parts?
- How do you properly dimension a 3D Part?

#### Learning Activity

- Students will: Utilize tutorials to develop drawings.
- Watch demonstration videos.
- Class Lecture and Discussion

#### Assessment Activity

- Students will: Use Revit Architecture to develop a 3D 1 bath and 1 bed cabin.

#### Evaluation

- Scoring guide for each project
- Check for understanding through oral discussion and teacher observation

#### Resources:
- Computer, textbooks, selected websites, projector

#### Enrichment Exercises:
- Students will add an detached garage.

#### Correction Exercises:
- Self-assessment and allow for revision

#### Special Needs:
- None needed for this unit
# Introduction to Rendering and Animation

**Learning Objective/Essential Course Outcome:**
Students will be introduced to several different areas of graphic design communications. This class develops a foundation which leads to higher levels of exploration in these design fields.

**Primary Text:** Various Online Software Tutorials

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**Standards**

- Content Standards
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  - MA 2
- Process Standards
  - 1.1, 1.2, 1.4, 1.9, 2.7, 3.7, 3.8, 4.5
- NGLS National Standards
  - TES 1, 2, 3, 8, 9, 10, 11, 17

**Guiding Questions**

- What are some of the basic tools and commands of animation and rendering?
- What is the proper use of light in a design?
- What is the proper way to set up a camera path for a virtual walk through and a pan-around?

**Learning Activity**

- Utilize tutorials to develop drawings.
- Watch demonstration videos.
- Class Lecture and Discussion

**Assessment Activity**

- Use 3DS Max to render and animate the projects form units 2 and 3.

**Evaluation**

- Scoring guide for each project
- Check for understanding through oral discussion and teacher observation

**Resources:** Computer, textbooks, selected websites, projector

**Enrichment Exercises:** Students will create an audio presentation to present to the class.

**Correction Exercises:** Self-assessment and allow for revision

**Special Needs:** None needed for this unit
Architectural Drawing & Design
Content Area: Industrial Technology
### Course Name:
Architectural Drafting and Design

### Grade:
10-12

### Duration of Unit:
10 days

#### Unit Title:
Overview of Architecture and the Design Process

#### Learning Objective/Essential Course Outcome:
Students will explain the purpose of drafting. Students will describe the difference between artistic and technical drawings. Students will be able to determine factors in the initial design of a home.

#### Primary Text: *Architecture, Residential Drawing and Design, Clois Kicklighter*

#### Standards

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#### Guiding Questions

- What is the purpose of drafting?
- What are the differences between artistic and technical drawings?
- What are typical features of home design? Why are homes designed in these typical ways?
- What are the determining factors in the initial design of a home?

#### Learning Activity

- Students will:
  - Read chapters 1, 2, 3, 5, 6, 7
  - Sketch different buildings and house designs around school campus.
  - Utilize the computer to look up different house plan designs and discuss the similarities and differences.
  - Identify different living areas of a home. (Living, Sleeping, & Service)

#### Assessment Activity

- Students will:
  - Create a technical floor plan of a home focusing on the different living areas.
  - Develop a list of considerations and specifications when designing a home.
  - Check for understanding through oral discussion and teacher observation

#### Evaluation

- Scoring guide for each project

#### Resources:
Computer, textbooks, selected websites, projector

#### Enrichment Exercises:
Research similarities and differences in residential buildings and commercial buildings.

#### Correction Exercises:
Self-assessment and allow for revision

#### Special Needs:
None needed for this unit
## Course Name:
Architectural Drafting and Design

## Grade:
10-12

## Duration of Unit:
5 days

## Unit Title:
Instruments and Techniques

### Learning Objective/Essential Course Outcome:
Students will identify instruments used in drawing and design. Students will use proper lettering skills and techniques used in the completion of a set of house plans. Students will use correct dimensioning practices on a set of house plans.

### Primary Text:
*Architecture, Residential Drawing and Design, Clois Kicklighter*

### Instructional Method (Strategy)

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### Guiding Questions

- What instruments are used in drawing and design?
- What are the proper lettering skills and techniques?
- Why is dimensioning important?
- What are the common lines and symbols used in house plans?

### Learning Activity

- Students will: Read chapter 4
- Utilize practice lettering worksheets.
- Draw border and title blocks.

### Assessment Activity

- Students will: Demonstrate proper lettering skills and techniques.
- Explain the importance of dimensioning.
- Describe common symbols and lines used in house plans.

#### Evaluation

Scoring guide for each project

Check for understanding through oral discussion and teacher observation

### Resources:
Computer, textbooks, selected websites, projector

### Enrichment Exercises:
Research similarities and differences in residential buildings and commercial buildings.

### Correction Exercises:
Self-assessment and allow for revision

### Special Needs:
The use of drawing aids and templates.
**Course Name:** Architectural Drafting and Design  
**Grade:** 10-12  
**Duration of Unit:** 15-20 days

**Unit Title:** Foundation and Floor Plans

**Learning Objective/Essential Course Outcome:**
Students will identify instruments used in drawing and design. Students will use proper skills and techniques in the completion foundation and floor plans. Students will utilize correct symbols and building codes on a set of house plans.

**Primary Text:** *Architecture, Residential Drawing and Design, Clois Kicklighter*

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**Guiding Questions**

- What are the basic symbols and building codes used in foundation and floor plans?
- What are the primary features included in a foundation plan?
- What are the common lines and symbols used in house plans?
- How are the sleeping, living and utility areas utilized in a floor plan?

**Learning Activity**

Students will:
- Read chapter 9, 10, 16
- Analyze a typical floor plan to determine the appropriate foundation.
- Research different house plans using reference books and the internet.

**Assessment Activity**

Students will:
- Design and draw a foundation plan for a typical residential structure.
- Design and draw a floor plan.

**Evaluation**

Scoring guide for each project.

Check for understanding through oral discussion and teacher observation.

**Resources:** Computer, textbooks, selected websites, projector

**Enrichment Exercises:** Research similarities and differences in residential buildings and commercial buildings.

**Correction Exercises:** Self-assessment and allow for revision

**Special Needs:** The use of drawing aids and templates.
**Course Name:** Architectural Drafting and Design  
**Grade:** 10-12  
**Duration of Unit:** 15-20 days

**Unit Title:** Elevations, Building Sections, Roof Plans

**Learning Objective/Essential Course Outcome:**  
Students will identify instruments used in drawing and design. Students will use proper skills and techniques in the completion of elevations, building sections and roof plans. Students will utilize correct symbols and building codes on a set of house plans.

**Primary Text:** *Architecture, Residential Drawing and Design, Clois Kicklighter*

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**Guiding Questions**  
What are the basic symbols and building codes used in elevations, building sections and roof plans?  
What are the primary features included in elevations, building sections and roof plans?  
What are the common lines and symbols used in house plans?  
What are the typical roof designs?

**Learning Activity**  
Students will:  
Read chapter 17, 18  
Use an existing floor plan and create an elevation view of it.  
Sketch ten different types of basic roof designs.

**Assessment Activity**  
Students will:  
Create all four elevation views of the floor plan created in unit 3.  
Identify the primary feature included in elevations, building sections and roof plans.  
Draw a roof plan for the house created in Unit 3.  

**Evaluation**  
Scoring guide for each project  
Check for understanding through oral discussion and teacher observation

**Resources:** Computer, textbooks, selected websites, projector  
**Enrichment Exercises:** Research similarities and differences in residential buildings and commercial buildings.  
**Correction Exercises:** Self-assessment and allow for revision  
**Special Needs:** The use of drawing aids and templates.
**Course Name:** Architectural Drafting and Design  
**Grade:** 10-12  
**Duration of Unit:** 15-20 days

**Unit Title:** Utilities

**Learning Objective/Essential Course Outcome:**  
Students will identify instruments used in drawing and design. Students will use proper skills and techniques in the completion of utility drawings. Students will utilize correct symbols and building codes on a set of house plans.

**Primary Text:** *Architecture, Residential Drawing and Design, Clois Kicklighter*

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- **Process Standards**
  - 1.4, 1.5, 2.7, 3.1, 3.4, 4.5
- **GLEs National Standards**
  - TES 1, 8, 11, 20

**Guiding Questions**

- What are the primary features included in an electrical Plan?
- What are the primary features in a plumbing plan?
- What are the primary features included a climate control plan?

**Learning Activity**

Students will:

- Read chapters 19, 20, 21, 22, 23, 24
- Research plumbing, electrical and climate control plans on using the internet.

**Assessment Activity**

Students will:

- Create a climate control, electrical & plumbing plan of the floor plan created in unit 3.

  **Evaluation**

  Scoring guide for each project

  Check for understanding through oral discussion and teacher observation

**Resources:** Computer, textbooks, selected websites, projector

**Enrichment Exercises:** Research similarities and differences in residential buildings and commercial buildings.

**Correction Exercises:** Self-assessment and allow for revision

**Special Needs:** The use of drawing aids and templates.
Mechanical and Computer Aided Drafting
Content Area: Industrial Technology
**Course Name:** Mechanical and Computerized Drafting  
**Grade:** 10-12  
**Duration of Unit:** 5 days

**Unit Title:** Introduction to Mechanical Drafting

**Learning Objective/Essential Course Outcome:**
Students will explain the purpose of drafting. Students will demonstrate the ability to effectively convey an idea using selected drafting and design techniques. Students will be able to determine factors in the initial design of a part.

**Primary Text:** *Mechanical Drawing, CAD Communications, French, Swenson, Helsel*

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<tr>
<td>What is the purpose of drafting?</td>
<td>Students will: Read Ch. 1, 2</td>
<td>Students will: Manually draw a title block and use correct lettering</td>
</tr>
<tr>
<td>What are the correct drafting and design techniques?</td>
<td>Lecture and demonstration</td>
<td>Lettering worksheets</td>
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<tr>
<td>What tools are used in sketching and lettering?</td>
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</table>

**Evaluation**
Scoring guide for each project
Check for understanding through oral discussion and teacher observation

**Resources:** Computer, textbooks, selected websites, projector
**Enrichment Exercises:** Extra lettering practices
**Correction Exercises:** Self-assessment and allow for revision
**Special Needs:** None needed for this unit
**Course Name:** Mechanical and Computerized Drafting  
**Grade:** 10-12  
**Duration of Unit:** 20 days

**Unit Title:** Introduction to 2D Design

**Learning Objective/Essential Course Outcome:** Students will explain the purpose of drafting. Students will demonstrate the ability to effectively convey an idea using selected drafting and design techniques. Students will be able to determine factors in the initial design of a part.

**Primary Text:** *Mechanical Drawing, CAD Communications, French, Swenson, Helsel*

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<td>Explain the purpose of drafting.</td>
<td>Students will: Read chapters: 3, 4, &amp; 5 Utilize CAD tutorials to develop drawings. Watch demonstration videos.</td>
<td>Students will: Use AutoCAD to develop orthographic projections.</td>
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<tr>
<td>What are some of the basic tools and commands of computer aided design?</td>
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<tr>
<td>What is orthographic projection?</td>
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<tr>
<td>What are different views in a set of working drawings?</td>
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**Resources:** Computer, textbooks, selected websites, projector  
**Enrichment Exercises:** Students will create more advanced orthographic projections  
**Correction Exercises:** Self-assessment and allow for revision  
**Special Needs:** None needed for this unit
**Course Name:** Mechanical and Computerized Drafting  
**Grade:** 10-12  
**Duration of Unit:** 10 days

**Unit Title:** Dimensioning Orthographic Projections

**Learning Objective/Essential Course Outcome:**  
Students will explain the purpose of drafting. Students will demonstrate the ability to effectively convey an idea using selected drafting and design techniques. Students will be able to determine factors in the initial design of a part.

**Primary Text:** Mechanical Drawing, CAD Communications, French, Swenson, Helsel

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- **Process Standards**  
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- **GLEs - National Standards**  
  - TES 1, 2, 3, 8, 9, 10, 11, 17, 19

- **Guiding Questions**  
  - What are the proper lines, notes and symbols used in dimensioning?  
  - What are tolerances?

- **Learning Activity**  
  - Students will:  
    - Read Ch. 6  
    - Utilize CAD tutorials to develop drawings.  
    - Watch demonstration videos.  
    - Teacher lecture and demonstration.

- **Assessment Activity**  
  - Students will:  
    - Use correct dimensioning techniques to dimension orthographic projections.  
    - Scoring guide for each project  
    - Check for understanding through oral discussion and teacher observation

**Resources:** Computer, textbooks, selected websites, projector  
**Enrichment Exercises:** Students will dimension previous drawings  
**Correction Exercises:** Self-assessment and allow for revision  
**Special Needs:** None needed for this unit
## Course Name:
Mechanical and Computerized Drafting

<table>
<thead>
<tr>
<th>Grade:</th>
<th>Duration of Unit:</th>
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<tbody>
<tr>
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<thead>
<tr>
<th>Unit Title:</th>
<th>Dimensioning Orthographic Projections</th>
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### Learning Objective/Essential Course Outcome:
Students will explain the purpose of drafting. Students will demonstrate the ability to effectively convey an idea using selected drafting and design techniques. Students will be able to determine factors in the initial design of a part.

### Primary Text: *Mechanical Drawing, CAD Communications, French, Swenson, Helsel*

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### Guiding Questions
What are auxiliary views?
What role does concept revolutions play in developing true size and shape of inclined surfaces?

### Learning Activity
Students will:
Read Ch. 7
Utilize CAD tutorials to develop drawings.
Watch demonstration videos.
Teacher Lecture and demonstration.

### Assessment Activity
Students will:
Project and draw auxiliary views of a part.

#### Evaluation
Scoring guide for each project
Check for understanding through oral discussion and teacher observation

### Resources:
Computer, textbooks, selected websites, projector

### Enrichment Exercises:
Students will produce more advanced drawings

### Correction Exercises:
Self-assessment and allow for revision

### Special Needs:
None needed for this unit
Course Name: Mechanical and Computerized Drafting  | Grade: 10-12  | Duration of Unit: 10 days

Unit Title: Descriptive Geometry and Sectional Views

Learning Objective/Essential Course Outcome:
Students will explain the purpose of drafting. Students will demonstrate the ability to effectively convey an idea using selected drafting and design techniques. Students will be able to determine factors in the initial design of a part.

Primary Text: *Mechanical Drawing, CAD Communications, French, Swenson, Helsel*

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Standards

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Guiding Questions

- What is descriptive geometry and how does it affect mechanical drawings?
- What are sectional views?
- How do you determine which is the appropriate sectional view?

Learning Activity

- Students will:
  - Read Ch. 8 & 9
  - Utilize CAD tutorials to develop drawings.
  - Watch demonstration videos.
  - Teacher Lecture and demonstration.

Assessment Activity

- Students will:
  - Manipulate points, lines, and planes in space for the purpose of establishing a drawing field.
  - Create a sectional view in the field that has been created.

Evaluation

- Scoring guide for each project
- Check for understanding through oral discussion and teacher observation

Resources: Computer, textbooks, selected websites, projector

Enrichment Exercises: Students will produce more advanced drawings

Correction Exercises: Self-assessment and allow for revision

Special Needs: None needed for this unit
## Course Name:
**Mechanical and Computerized Drafting**

## Grade:
10-12

## Duration of Unit:
10 days

### Unit Title:
**Working Drawings**

### Learning Objective/Essential Course Outcome:
Students will explain the purpose of drafting. Students will demonstrate the ability to effectively convey an idea using selected drafting and design techniques. Students will be able to determine factors in the initial design of a part.

### Primary Text: *Mechanical Drawing, CAD Communications, French, Swenson, Helsel*

### Equity/Workplace Readiness

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### Standards

- **Content Standards**
- **Process Standards**
  - 1.1, 1.2, 1.4, 1.9, 2.7, 3.7, 3.8, 4.5
- **GLES National Standards**
  - TES 1, 2, 3, 8, 9, 10, 11, 17, 19

### Guiding Questions

- **What views are in a set of working drawings?**
- **How do you tabulate parts to be produced in a range of sizes?**

### Learning Activity

- Students will: Read Ch. 10 & 11
- Utilize CAD tutorials to develop drawings.
- Watch demonstration videos.
- Teacher Lecture and demonstration.

### Assessment Activity

- Students will: Create a detailed set of working drawings for a part.
- **Evaluation**
  - Scoring guide for each project
  - Check for understanding through oral discussion and teacher observation

### Resources:
- Computer, textbooks, selected websites, projector

### Enrichment Exercises:
- Students will produce more advanced drawings

### Correction Exercises:
- Self-assessment and allow for revision

### Special Needs:
- None needed for this unit
Course Name: Mechanical and Computerized Drafting  
Grade: 10-12  
Duration of Unit: 20 days

Unit Title: Three Dimensional Part Design

Learning Objective/Essential Course Outcome: Students will explain the purpose of drafting. Students will demonstrate the ability to effectively convey an idea using selected drafting and design techniques. Students will be able to determine factors in the initial design of a part.

Primary Text: Mechanical Drawing, CAD Communications, French, Swenson, Helsel

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**Standards**

- **Content Standards**
  - CA 3, 5, 6
  - MA 2

- **Process Standards**
  - 1.1, 1.2, 1.4, 1.9, 2.7, 3.7, 3.8, 4.5

- **GLEs - National Standards**
  - TES 1, 2, 3, 8, 9, 10, 11, 17, 19

**Guiding Questions**

- What are some of the basic tools and commands of 3D design?
- How do you extrude 2D shapes into 3D parts?
- How do you properly dimension a 3D Part?

**Learning Activity**

- Students will:
  - Utilize tutorials to develop drawings.
  - Watch demonstration videos.
  - Class Lecture and Discussion

**Assessment Activity**

- Students will:
  - Use Inventor to develop 3D Parts.

  **Evaluation**
  - Scoring guide for each project
  - Check for understanding through oral discussion and teacher observation

**Resources:** Computer, textbooks, selected websites, projector

**Enrichment Exercises:** Students will produce more advanced drawings

**Correction Exercises:** Self-assessment and allow for revision

**Special Needs:** None needed for this unit
**Unit Title:** Advanced Rendering and Animation

**Learning Objective/Essential Course Outcome:**
Students will explain the purpose of drafting. Students will demonstrate the ability to effectively convey an idea using selected drafting and design techniques. Students will be able to determine factors in the initial design of a part.

**Primary Text:** *Mechanical Drawing, CAD Communications, French, Swenson, Helsel*

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**Standards**
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- **GLEs National Standards**
  - TES 1, 2, 3, 8, 9, 10, 11, 17, 19

**Guiding Questions**
- What are some of the basic tools and commands of animation and rendering?
- What is the proper use of light in a design?
- What is the proper way to set up a camera path for a virtual walk through and a pan-around?

**Learning Activity**
- Students will:
  - Utilize tutorials to develop drawings.
  - Watch demonstration videos.
  - Class lecture and discussion

**Assessment Activity**
- Students will:
  - Import previous CAD & *Inventor* drawings into *3DS Max*
  - Use *3DS Max* to render and animate the projects from units 2 and 3.

**Evaluation**
- Scoring guide for each project
- Check for understanding through oral discussion and teacher observation

**Resources:** Computer, textbooks, selected websites, projector

**Enrichment Exercises:** Students will produce more advanced drawings

**Correction Exercises:** Self-assessment and allow for revision

**Special Needs:** None needed for this unit
Design & Machine Processes
Content Area: Industrial Technology
## Course Name:
Design & Machine Processes

## Grade:
10-12

## Duration of Unit:
5 days

### Unit Title:
Unit 1 Safety

### Learning Objective/Essential Course Outcome:
Students will learn the basic procedures for using common hand tools, portable power tools and industrial grade material processing tools. Students will learn correct skills, techniques, problem solving and decision making in the design of a project. Students will learn the proper safety for use of tools and working in an industry setting.

### Primary Text: Wood: Technology & Processes, Feirer & Feirer

### Equity/Workplace Readiness

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### Instructional Method (Strategy)

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### Guiding Questions

- What are the safety rules for the use of hand and power tools?
- What are the proper safety procedures for working an industrial environment?

### Learning Activity

- Students will: Read Ch. 1 & 2
- Lecture and demonstration
- Handouts & PowerPoint presentations on safety

### Assessment Activity

- Students will: Complete safety worksheets.
- Complete safety test.

**Evaluation**

- Scoring guide for each project
- Check for understanding through oral discussion and teacher observation

### Resources:
Computer, textbooks, selected websites, projector

### Enrichment Exercises:
Students will examine examples of unsafe use of equipment to see what not to do.

### Correction Exercises:
Self-assessment and allow for revision

### Special Needs:
None needed for this unit
# Unit 2 Hand & Power Tools

## Learning Objective/Essential Course Outcome:
Students will learn the basic procedures for using common hand tools, portable power tools and industrial grade material processing tools. Students will learn correct skills, techniques, problem solving and decision making in the design of a project. Students will learn the proper safety for use of tools and working in an industry setting.

## Primary Text: *Wood: Technology & Processes, Feirer & Feirer*

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## Standards

- **Content Standards**
  - CA 3, 5, 6
  - MA 2

- **Process Standards**
  - 1.1, 1.2, 1.4, 1.9, 2.7, 3.7, 3.8, 4.5

- **GLEs - National Standards**
  - TES 1, 2, 3, 8, 9, 10, 11, 20

## Guiding Questions

- How do you properly use the various power tools in the class and what are they used for?
- How do you properly use the various hand tools in the class and what are they used for?

## Learning Activity

Students will:
- Read Ch. 5, 6, & 7
- Lecture and Demonstration

## Assessment Activity

Students will:
- Demonstrate the proper use of tools.
- Identify what process in which the tools are used.

**Evaluation**

- Scoring guide for each project
- Check for understanding through oral discussion and teacher observation

## Resources:
Computer, textbooks, selected websites, projector

## Enrichment Exercises:
Movement into the next step of the design and build process

## Correction Exercises:
Self-assessment and allow for revision

## Special Needs:
None needed for this unit
### Course Name:
Design & Machine Processes

### Grade:
10-12

### Duration of Unit:
2 days (Ongoing)

#### Unit Title:
Unit 3 Planning, Measuring, & Design

#### Learning Objective/Essential Course Outcome:
Students will learn the basic procedures for using common hand tools, portable power tools and industrial grade material processing tools. Students will learn correct skills, techniques, problem solving and decision making in the design of a project. Students will learn the proper safety for use of tools and working in an industry setting.

#### Primary Text: Wood: Technology & Processes, Feirer & Feirer

#### Equity/Workplace Readiness

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#### Standards

- Content Standards: CA 3, 5, 6
- Process Standards: 1.1, 1.2, 1.4, 1.9, 2.7, 3.7, 3.8, 4.5
- GLEs: National Standards TES 1, 2, 3, 8, 9, 10, 11, 20

#### Guiding Questions
- How do you properly fill out a bill of materials?
- What are the tools used for layout and measuring?

#### Learning Activity
- Students will:
  - Read Ch. 3 & 4
  - Lecture and Demonstration

#### Assessment Activity
- Students will:
  - Complete of a bill of materials.
  - Demonstrate the correct use of layout and measuring tools.

**Evaluation**
Scoring guide for each project

Check for understanding through oral discussion and teacher observation

#### Resources:
Computer, textbooks, selected websites, projector

#### Enrichment Exercises:
Movement into the next step of the design and build process

#### Correction Exercises:
Self-assessment and allow for revision

#### Special Needs:
None needed for this unit
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<th>Duration of Unit: 2 days (Ongoing)</th>
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**Unit Title:**

Unit 4 Power Sawing

**Learning Objective/Essential Course Outcome:**

Students will learn the basic procedures for using common hand tools, portable power tools and industrial grade material processing tools. Students will learn correct skills, techniques, problem solving and decision making in the design of a project. Students will learn the proper safety for use of tools and working in an industry setting.

**Primary Text:** *Wood: Technology & Processes, Feirer & Feirer*

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**Standards**

| CA 3, 5, 6 | MA 2 |

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**Guiding Questions**

What tools are used in the power sawing process?

What are the basic techniques used in power sawing?

**Learning Activity**

Students will:

Read Ch. 22, 23, 24, 25, & 26

Lecture and demonstration

**Assessment Activity**

Students will:

Completion of a project.

Correct use of basic techniques in power sawing.

**Evaluation**

Scoring guide for each project

Check for understanding through oral discussion and teacher observation

**Resources:** Computer, textbooks, selected websites, projector

**Enrichment Exercises:** Movement into the next step of the design and build process

**Correction Exercises:** Self-assessment and allow for revision

**Special Needs:** None needed for this unit
# Course Name:
Design & Machine Processes

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## Unit Title:
Unit 5 Forming & Shaping

### Learning Objective/Essential Course Outcome:
Students will learn the basic procedures for using common hand tools, portable power tools and industrial grade material processing tools. Students will learn correct skills, techniques, problem solving and decision making in the design of a project. Students will learn the proper safety for use of tools and working in an industry setting.

### Primary Text:
*Wood: Technology & Processes, Feirer & Feirer*

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</table>

### Guiding Questions
- What tools are used in the forming and shaping process?
- What are the basic techniques used in forming and shaping?

### Learning Activity
- Students will:
  - Read Ch. 20, 21, 28, 29, & 30
  - Lecture and Demonstration

### Assessment Activity
- Students will:
  - Complete a project.
  - Show correct use of basic techniques in forming and shaping.

#### Evaluation
- Scoring guide for each project
- Check for understanding through oral discussion and teacher observation

### Resources:
Computer, textbooks, selected websites, projector

### Enrichment Exercises:
Movement into the next step of the design and build process

### Correction Exercises:
Self-assessment and allow for revision

### Special Needs:
None needed for this unit
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<th>Course Name:</th>
<th>Design &amp; Machine Processes</th>
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<td>Students will learn the basic procedures for using common hand tools, portable power tools and industrial grade material processing tools. Students will learn correct skills, techniques, problem solving and decision making in the design of a project. Students will learn the proper safety for use of tools and working in an industry setting.</td>
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<th>Guiding Questions</th>
<th>Learning Activity</th>
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<td>What components are used in the assembly process?</td>
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<td>Students will:</td>
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<tr>
<td></td>
<td>Read Ch. 8-19</td>
<td>Complete a project.</td>
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<td>Lecture and Demonstration</td>
<td>Show correct use of basic techniques in the assembly process.</td>
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<td>What are the basic techniques used in assembly?</td>
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<tr>
<th>Resources:</th>
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<td>Correction Exercises:</td>
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<td>Special Needs:</td>
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**Unit 7 Finishing**

**Learning Objective/Essential Course Outcome:**
Students will learn the basic procedures for using common hand tools, portable power tools and industrial grade material processing tools. Students will learn correct skills, techniques, problem solving and decision making in the design of a project. Students will learn the proper safety for use of tools and working in an industry setting.

**Primary Text:** *Wood: Technology & Processes, Feirer & Feirer*

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- Content Standards: CA 3, 5, 6, MA 2
- Process Standards: 1.1, 1.2, 1.4, 1.9, 2.7, 3.7, 3.8, 4.5
- GLEs: National Standards: TES 1, 2, 3, 8, 9, 10, 11, 20

**Guiding Questions**

- What components are used in the finishing process?
- What are the basic techniques used in finishing a project?

**Learning Activity**

- Students will:
  - Read Ch. 31, 32, & 33
  - Lecture and demonstration

**Assessment Activity**

- Students will:
  - Complete a project.
  - Show correct use of basic techniques in finishing.

**Evaluation**

- Scoring guide for each project
- Check for understanding through oral discussion and teacher observation

**Resources:** Computer, textbooks, selected websites, projector

**Enrichment Exercises:** Movement into the next step of the design and build process

**Correction Exercises:** Self-assessment and allow for revision

**Special Needs:** None needed for this unit
Advanced Solutions in Design & Machine Processes
Content Area: Industrial Technology
<table>
<thead>
<tr>
<th>Course Name:</th>
<th>Advanced Solutions in Design &amp; Machine Processes</th>
<th>Grade: 10-12</th>
<th>Duration of Unit: 5 days (Ongoing)</th>
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**Unit Title:** Safety

**Learning Objective/Essential Course Outcome:**
Students will utilize the basic and advanced procedures for using common hand tools, portable power tools and industrial grade material processing tools. Students will utilize correct skills, techniques, problem solving and decision making in the design of a project. Students will take what they have learned from the Home Repairs and Design & Machine Processes class and apply those skills in this course.

**Primary Text:** *Wood: Technology & Processes, Feirer & Feirer, Various reference books*

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**Guiding Questions**

- What are the safety rules for the use of hand and power tools?
- What are the proper safety procedures for working an industrial environment?

**Learning Activity**

- Students will:
  - Read Ch. 1 & 2
  - Lecture and Demonstration
  - Handouts & Power point presentations of Safety

**Assessment Activity**

- Students will:
  - Complete safety worksheets.
  - Pass a safety test.

  **Evaluation**
  - Scoring guide for each project
  - Check for understanding through oral discussion and teacher observation

**Resources:** Computer, textbooks, selected websites, projector

**Enrichment Exercises:** Students will utilize all aspects of safety in the building of a project

**Correction Exercises:** Self-assessment and allow for revision

**Special Needs:** None needed for this unit
**Course Name:** Advanced Solutions in Design & Machine Processes  
**Grade:** 10-12  
**Duration of Unit:** (Ongoing)

**Unit Title:** Advanced Skills and Techniques

**Learning Objective/Essential Course Outcome:**
Students will utilize the basic and advanced procedures for using common hand tools, portable power tools and industrial grade material processing tools. Students will utilize correct skills, techniques, problem solving and decision making in the design of a project. Students will take what they have learned from the Home Repairs and Design & Machine Processes class and apply those skills in this course.

**Primary Text:** *Wood: Technology & Processes, Feirer & Feirer*, Various reference books

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**Standards**

- Content Standards: CA 3, 5, 6 MA 2
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- GLEs - National Standards: TES 1, 2, 3, 8, 9, 10, 11, 20

**Guiding Questions**

What are some advanced skills and techniques utilized in the construction trades?

**Learning Activity**

Students will:
- Lecture and Demonstration
- Reference Books

**Assessment Activity**

- Students will:
  - Utilize advanced skills and techniques on various projects.
  - **Evaluation**
    - Scoring guide for each project
    - Check for understanding through oral discussion and teacher observation

**Resources:** Computer, textbooks, selected websites, projector

**Enrichment Exercises:** Students will utilize continue on in the building process

**Correction Exercises:** Self-assessment and allow for revision

**Special Needs:** None needed for this unit
# Advanced Solutions in Design & Machine Processes

**Grade:** 10-12  
**Duration of Unit:** (Ongoing)

## Various Projects

**Learning Objective/Essential Course Outcome:**
Students will utilize the basic and advanced procedures for using common hand tools, portable power tools and industrial grade material processing tools. Students will utilize correct skills, techniques, problem solving and decision making in the design of a project. Students will take what they have learned from the Home Repairs and Design & Machine Processes class and apply those skills in this course.

**Primary Text:** *Wood: Technology & Processes, Feirer & Feirer*, Various reference books

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<td>GLEs National Standards TES 1, 2, 3, 8, 9, 10, 11, 20</td>
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## Guiding Questions
What are some of the various projects that can be completed?

## Learning Activity
Students will:
- Lecture and demonstration
- Reference books

## Assessment Activity
Students will:
- Complete individual projects and complete assigned school improvement projects.

### Evaluation
Scoring guide for each project

Check for understanding through oral discussion and teacher observation

### Resources
Computer, textbooks, selected websites, projector

### Enrichment Exercises
Students will utilize continue on in the building process

### Correction Exercises
Self-assessment and allow for revision

### Special Needs
None needed for this unit
**Course Name:** Advanced Solutions in Design & Machine Processes  
**Grade:** 10-12  
**Duration of Unit:** (Ongoing)

**Unit Title:** Teamwork & Professionalism

**Learning Objective/Essential Course Outcome:**
Students will utilize the basic and advanced procedures for using common hand tools, portable power tools and industrial grade material processing tools. Students will utilize correct skills, techniques, problem solving and decision making in the design of a project. Students will take what they have learned from the Home Repairs and Design & Machine Processes class and apply those skills in this course.

**Primary Text:** *Wood: Technology & Processes, Feirer & Feirer, Various reference books*

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**Standards**

**Content Standards**
- CA 3, 5, 6  
- MA 2  

**Process Standards**
- 1.1, 1.2, 1.4, 1.9, 2.7, 3.7, 3.8, 4.5  

**GLEs (National Standards)**
- TES 1, 2, 3, 8, 9, 10, 11, 20

**Guiding Questions**

What are the qualities of a team player?

How do you utilize the strengths of each person to benefit the team as a whole?

**Learning Activity**

Students will:
- Lecture and demonstration
- Reference books
- Practice working together in teams

**Assessment Activity**

Students will:
- Complete a team project(s).
- Evaluation
  - Scoring guide for each project
  - Check for understanding through oral discussion and teacher observation

**Resources:** Computer, textbooks, selected websites, projector

**Enrichment Exercises:** Students will utilize continue on in the building process

**Correction Exercises:** Self-assessment and allow for revision

**Special Needs:** None needed for this unit
Advanced Technological Solutions
Content Area: Industrial Technology
## Course Name:
Advanced Technological Solutions

## Grade:
9-12

## Duration of Unit:
Ongoing

### Unit Title:
**Advanced Two Dimensional Design**

### Learning Objective/Essential Course Outcome:
Students will use advanced skills in several different areas of graphic design communications. This class utilizes the skills learned in GEM, Mechanical Drafting, and Architectural Design to complete advanced projects in graphic communications.

### Primary Text: *Various Online Software Tutorials*

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### Guiding Questions
What are some advanced skills in two dimensional design?

### Learning Activity
Students will:
- Utilize CAD tutorials to develop drawings.
- Watch demonstration videos.

### Assessment Activity
Students will:
- Utilize different software to create advanced projects in two dimensional designs.
- **Evaluation**
  - Scoring guide for each project
  - Check for understanding through oral discussion and teacher observation

### Resources:
- Computer, textbooks, selected websites, projector

### Enrichment Exercises:
- Students will complete a schematic of a 2D Floor Plan.

### Correction Exercises:
- Self-assessment and allow for revision

### Special Needs:
- None needed for this unit
Course Name: Advanced Technological Solutions  
Grade: 9-12  
Duration of Unit: Ongoing

Unit Title: Advanced 3D Mechanical Design

Learning Objective/Essential Course Outcome:
Students will use advanced skills in several different areas of graphic design communications. This class utilizes the skills learned in GEM, Mechanical Drafting, and Architectural Design to complete advanced projects in graphic communications.

Primary Text: Various Online Software Tutorials

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Guiding Questions
What are some advanced skills in 3D dimensional design?

Learning Activity
Students will:
Utilize CAD tutorials to develop drawings.
Watch demonstration videos.

Assessment Activity
Students will:
Utilize different software to create advanced projects in 3D dimensional designs.

Evaluation
Scoring guide for each project
Check for understanding through oral discussion and teacher observation

Resources: Computer, textbooks, selected websites, projector

Enrichment Exercises: Students will complete an assembly of multiple parts
Correction Exercises: Self-assessment and allow for revision
Special Needs: None needed for this unit
<table>
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<th>Course Name: Advanced Technological Solutions</th>
<th>Grade: 9-12</th>
<th>Duration of Unit: Ongoing</th>
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**Unit Title:**
**Advanced 3D Architectural Design**

**Learning Objective/Essential Course Outcome:**
Students will use advanced skills in several different areas of graphic design communications. This class utilizes the skills learned in GEM, Mechanical Drafting, and Architectural Design to complete advanced projects in graphic communications.

**Primary Text:** *Various Online Software Tutorials*

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**Guiding Questions**
What are some advanced skills in 3D Architectural design?

**Learning Activity**
Students will:
- Utilize CAD tutorials to develop drawings.
- Watch demonstration videos.

**Assessment Activity**
Students will:
- Utilize different software to create advanced projects in 3D Architectural designs.

**Evaluation**
Scoring guide for each project

Check for understanding through oral discussion and teacher observation

**Resources:** Computer, textbooks, selected websites, projector

**Enrichment Exercises:** Students will add a detached garage.

**Correction Exercises:** Self-assessment and allow for revision

**Special Needs:** None needed for this unit
### Course Name:
Advanced Technological Solutions

### Grade:
9-12

### Duration of Unit:
Ongoing

#### Unit Title:
**Advanced Rendering and Animation**

#### Learning Objective/Essential Course Outcome:
Students will use advanced skills in several different areas of graphic design communications. This class utilizes the skills learned in GEM, Mechanical Drafting, and Architectural Design to complete advanced projects in graphic communications.

#### Primary Text: *Various Online Software Tutorials*

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**Evaluation**

Scoring guide for each project
Check for understanding through oral discussion and teacher observation

#### Resources:
Computer, textbooks, selected websites, projector

#### Enrichment Exercises:
Students will create an audio presentation to present to the class.

#### Correction Exercises:
Self-assessment and allow for revision

#### Special Needs:
None needed for this unit
Home Repairs
Content Area: Industrial Technology
**Course Name:** Home Repairs  
**Grade:** 10-12  
**Duration of Unit:** 5 days

**Unit Title:**  
**Intro to Home Repair and Safety**

**Learning Objective/Essential Course Outcome:**  
Students will understand the benefits of doing their own home maintenance. They will know the tools used in basic maintenance and the safety rules that go with them.

**A+ Objective (High School Only):**

**Primary Text:** *Home Repair and Maintenance, Jack M. Landers*

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**Guiding Questions**

- What are some reasons for doing your own home maintenance?
- What are some basic tools used in home construction and maintenance?
- What are some basic safety rules to prevent accidents in the home?

**Learning Activity**

- Students will:
  - Read chapters 1 & 2
  - Tool Bingo
  - Class Lecture and Discussion

**Assessment Activity**

- Students will:
  - Complete a tool test.
  - Complete a shop safety test.

**Evaluation**

- Scoring guide for each project
- Check for understanding through oral discussion and teacher observation

**Resources:** Computer, textbooks, selected websites, projector

**Enrichment Exercises:** Research the steps to complete different home repair and maintenance projects.

**Correction Exercises:** Self-assessment and allow for revision

**Special Needs:** Read tests and or provide multiple choice or word bank.
## Course Name: Home Repairs

### Grade: 10-12

### Duration of Unit: 25 days

## Unit Title:

**Home Design and Framing**

**Learning Objective/Essential Course Outcome:**
Students will know the functionality of house design. They will also know framing members and how they go together to frame a structurally sound wall including rough openings for windows and doors.

**Primary Text:** *Home Repair and Maintenance, Jack M. Landers*

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### Guiding Questions

- How and why are houses designed and put together the way they are?
- What are the various framing members of a house?
- How is a house framed?

### Learning Activity

- Students will:
  - Sketch their house, then compare and contrast those to other houses in class.
  - Watch video and fill out framing worksheet.

### Assessment Activity

- Students will:
  - Design and draw an original ¼” = 1’ scale floor plan.
  - Frame the exterior walls of their ¼” = 1’ house drawing.

**Evaluation**
Scoring rubric for each project

- Check for understanding through oral discussion and teacher observation

### Resources:
Computer, textbooks, selected websites, projector

### Enrichment Exercises:
Frame the interior walls of their house.

### Correction Exercises:
Self-assessment and allow for revision

### Special Needs:
None needed for this unit.
**Course Name:** Home Repairs  
**Grade:** 10-12  
**Duration of Unit:** 5 days

**Unit Title:** Plumbing

**Learning Objective/Essential Course Outcome:**
Students will know about supply and waste lines and how they work within the plumbing system in their house. They will be able to fit pvc and sweat copper.

**Primary Text:** *Home Repair and Maintenance, Jack M. Landers*

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**Guiding Questions**

- What are some fixtures used in home wastewater systems?
- How are home wastewater systems put together?
- What are some fixtures used in home water supply systems?
- How are home water supply systems put together?

**Learning Activity**

- Students will:
  - Read Chapter 23 & 24 in Home Repair Textbook.
  - Class lecture and discussion.

**Assessment Activity**

- Students will:
  - Put together a pvc pipe project.
  - Put together a copper pipe project.

**Evaluation**

- Scoring rubric for each project
- Check for understanding through oral discussion and teacher observation

**Resources:** Computer, textbooks, selected websites, projector

**Enrichment Exercises:** Alternate design for copper and pvc projects.

**Correction Exercises:** Self-assessment and allow for revision

**Special Needs:** None needed for this unit.

---

66
Course Name: Home Repairs  
Grade: 10-12  
Duration of Unit: 5 days

Unit Title: Doors and Interior Walls

Learning Objective/Essential Course Outcome: Students will know the procedures for hanging doors and windows and finishing drywall.

Primary Text: *Home Repair and Maintenance, Jack M. Landers*

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**Standards**

**Guiding Questions**

What are some types of doors and windows and how are they installed and maintained?

How are interior walls finished?

**Learning Activity**

Students will:

Read Chapter 11 & 12 in Home Repair Textbook.

Class lecture and discussion.

**Assessment Activity**

Students will:

Frame doors and windows on their ¼” = 1’ house project.

Hang drywall and finish a corner and seam.

**Evaluation**

Scoring rubric for each project

Check for understanding through oral discussion and teacher observation

**Resources:** Computer, textbooks, selected websites, projector

**Enrichment Exercises:** Students can frame specialty doors and windows into their house design.

**Correction Exercises:** Self-assessment and allow for revision

**Special Needs:** None needed for this unit.
**Course Name:** Home Repairs  
**Grade:** 10-12  
**Duration of Unit:** 5 days

### Unit Title:
**Electrical**

**Learning Objective/Essential Course Outcome:**
Students will know various types of supplies and equipment used for wiring houses for electricity. They will also be able to wire 4 different circuits.

**A+ Objective (High School Only):**

**Primary Text:** *Home Repair and Maintenance, Jack M. Landers*

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  - MA 2
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- **GLEs - National Standards**
  - TES 1, 2, 3, 8, 9, 10, 11

**Guiding Questions**
- What type of supplies and equipment are used in wiring a house for electricity?
- How are houses wired for electricity?

**Learning Activity**
- Students will:
  - Read Chapter 26 in Home Repair Textbook.
- Class lecture and discussion.

**Assessment Activity**
- Students will:
  - Wire four types of circuits on the electrical trainer.
  - **Evaluation**
    - Scoring rubric for each project
    - Check for understanding through oral discussion and teacher observation

**Resources:** Computer, textbooks, selected websites, projector  
**Enrichment Exercises:** Have students explain the path of the electricity through each circuit.  
**Correction Exercises:** Self-assessment and allow for revision  
**Special Needs:** None needed for this unit.
Transportation Systems
Content Area: Industrial Technology
Course Name: Transportation Systems  | Grade: 10-12  | Duration of Unit: 5 days

Unit Title: **Intro to Transportation Systems**

**Learning Objective/Essential Course Outcome:**
Students will understand various parts of our transportation system and understand their importance in modern society.

**Primary Text:** *Exploring Transportation, Stephen R. Johnson / Patricia A. Farrar-Hunter*

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**Guiding Questions**

- What is transportation and how has it evolved?
- What role do engineers play in our transportation system?

**Learning Activity**

- Students will:
  - Read Chapter 1 in Transportation textbook.
  - Watch Engineering Disasters video
  - Class lecture and discussion.

**Assessment Activity**

- Students will:
  - Complete a transportation-themed presentation.
  - Complete a paper tower project.

**Evaluation**

- Scoring rubric for each project
- Check for understanding through oral discussion and teacher observation

**Resources:** Computer, textbooks, selected websites, projector

**Enrichment Exercises:** Have students rebuild paper towers using knowledge gained through their first experience to make their tower taller.

**Correction Exercises:** Self-assessment and allow for revision

**Special Needs:** None needed for this unit.
Course Name: Transportation Systems  
Grade: 10-12  
Duration of Unit: 10 days

Unit Title: Air Transportation

Learning Objective/Essential Course Outcome: Students will understand the parts of a plane and the basic engineering principles a plane uses to generate lift.

Primary Text: *Home Repair and Maintenance, Jack M. Landers*

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GLEs-National Standards  
TES 1, 2, 3, 8, 9, 10, 11

Guiding Questions

- What are the basic parts of an airplane?  
- How do airplanes generate lift?

Learning Activity

Students will:  
Read Chapter 13 in Transportation Textbook.  
Research flight on the computer  
Class lecture and discussion.

Assessment Activity

Students will:  
Build the Delta Dart airplane.  
Design and build an original airplane.  
**Evaluation**  
Scoring rubric for each project  
Check for understanding through oral discussion and teacher observation

Resources: Computer, textbooks, selected websites, projector  
Enrichment Exercises: Have students add and adjust flaps to their plane in order to control the direction it flies.  
Correction Exercises: Self-assessment and allow for revision  
Special Needs: Read instructions as needed during the building of the Delta Dart.
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**Unit Title:**

**Water Transportation**

**Learning Objective/Essential Course Outcome:**
Students will understand the various parts of a sailboat and understand what each part does to improve a boat’s performance.

**Primary Text:** *Exploring Transportation, Stephen R. Johnson / Patricia A. Farrar-Hunter*

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<th>Learning Activity</th>
<th>Assessment Activity</th>
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<tr>
<td>What are the basic parts of a sailboat?</td>
<td>Students will: Read Chapter 12 in Transportation Textbook. Research sailboats on the computer. Class lecture and discussion.</td>
<td>Students will: Pass the shop and machine safety tests at 100% Build and race an original sailboat. <strong>Evaluation</strong> Scoring rubric for each project Check for understanding through oral discussion and teacher observation</td>
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<td>How does hull and sail design factor into a sailboat’s performance?</td>
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**Resources:** Computer, textbooks, selected websites, projector

**Enrichment Exercises:** Have students add a working rudder to their sailboat in order to correct unwanted change of direction.

**Correction Exercises:** Self-assessment and allow for revision

**Special Needs:** Help students with power equipment as needed.
<table>
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<th>Course Name: Transportation Systems</th>
<th>Grade: 10-12</th>
<th>Duration of Unit: 20 days</th>
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### Unit Title: Land Transportation

**Learning Objective/Essential Course Outcome:**
Students will understand the parts of a bridge and the basic engineering principles it incorporates. They will also understand the aerodynamic forces of friction and drag and how they affect automobiles.

**Primary Text:** *Exploring Transportation, Stephen R. Johnson / Patricia A. Farrar-Hunter*

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#### Guiding Questions

1. What are the parts of our land transportation system and how do they work together?
2. What are some basic engineering principles involved in bridge building?
3. What engineering principles play a factor in automobile design?

#### Learning Activity

- Students will:
  - Read Chapter 11 in Transportation Textbook.
  - Bridge research on the computer
  - CO2 car research on the computer
  - Class lecture and discussion.

#### Assessment Activity

- Students will:
  - Design and build an original bridge.
  - Design and build an original CO2 car.

**Evaluation**

- Scoring rubric for each project
- Check for understanding through oral discussion and teacher observation

**Resources:** Computer, textbooks, selected websites, projector

**Enrichment Exercises:** Have students brainstorm ways to improve their projects.

**Correction Exercises:** Self-assessment and allow for revision

**Special Needs:** Help students, as needed, with the power equipment.
## Course Name: Transportation Systems
### Grade: 10-12
### Duration of Unit: 10 days

## Unit Title: Space Transportation

### Learning Objective/Essential Course Outcome:
Students will understand the parts of a rocket and the basic engineering principles and forces it must deal with.

### A+ Objective (High School Only):

### Primary Text: *Exploring Transportation, Stephen R. Johnson / Patricia A. Farrar-Hunter*

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### Standards
- **Content Standards**: CA 3, 5, 6, MA 2
- **Process Standards**: 1.1, 1.2, 1.4, 1.9, 2.7, 3.7, 3.8, 4.5
- **GLEs**: National Standards TES 1, 2, 3, 8, 9, 10, 11

### Guiding Questions
- What makes a spacecraft fly?
- What are some basic engineering principles involved in the building of space craft?

### Learning Activity
- Students will:
  - Read Chapter 14 in Transportation textbook.
  - Rocket research on the computer
  - Class lecture and discussion.

### Assessment Activity
- Students will:
  - Design and build a rocket to be tested.
  - Scoring rubric for each project
  - Check for understanding through oral discussion and teacher observation

### Evaluation

### Resources:
- Computer, textbooks, selected websites, projector

### Enrichment Exercises:
- Have students brainstorm ways to improve their project.

### Correction Exercises:
- Self-assessment and allow for revision

### Special Needs:
- Help students, as needed, with the construction of the rocket project.
Appendix
THE SHOW-ME STANDARDS

Authority for the Show-Me Standards: Section 160.514, Revised Statutes of Missouri, and the Code of State Regulation, 5 CSR 50-375.100

PERFORMANCE (PROCESS) STANDARDS

GOAL 1: Students in Missouri public schools will acquire the knowledge and skills to gather, analyze and apply information and ideas.

Students will demonstrate within and integrate across all content areas the ability to
1.1 develop questions and ideas to initiate and refine research
1.2 conduct research to answer questions and evaluate information and ideas
1.3 design and conduct field and laboratory investigations to study nature and society
1.4 use technological tools and other resources to locate, select and organize information
1.5 comprehend and evaluate written, visual and oral presentations and works
1.6 discover and evaluate patterns and relationships in information, ideas and structures
1.7 evaluate the accuracy of information and the reliability of its sources
1.8 organize data, information and ideas into useful forms (including charts, graphs, outlines) for analysis or presentation
1.9 identify, analyze and compare the institutions, traditions and art forms of past and present societies
1.10 apply acquired information, ideas, and skills to different contexts as students, workers, citizens and consumers

GOAL 2: Students in Missouri public schools will acquire the knowledge and skills to communicate effectively within and beyond the classroom.

Students will demonstrate within and integrate across all content areas the ability to
2.1 plan and make written, oral and visual presentations for a variety of purposes and audiences
2.2 review and revise communications to improve accuracy and clarity
2.3 exchange information, question and ideas while recognizing the perspectives of others
2.4 present perceptions and ideas regarding works of the art, humanities and sciences
2.5 perform or produce works in the fine and practical arts
2.6 apply communication techniques to the job search and to the workplace
2.7 use technological tools to exchange information and ideas

GOAL 3: Students in Missouri public schools will acquire knowledge and skills to recognize and solve problems.

Students will demonstrate within and integrate across all content areas the ability to
3.1 identify problems and define their scope and elements
3.2 develop and apply strategies based on ways others have prevented or solved problems
3.3 develop and apply strategies based on one’s own experience in preventing or solving problems
3.4 evaluate the processes used in recognizing and solving problems
3.5 reason inductively from a set of specific facts and deductively from general premises
3.6 examine problems and proposed solutions from multiple perspectives
3.7 evaluate the extent to which a strategy addresses the problem
3.8 assess costs, benefits and other consequences of proposed solutions

GOAL 4: Students in Missouri public schools will acquire the knowledge and skills to make decisions and act as responsible members of society.

Students will demonstrate within and integrate across all content areas the ability to
4.1 explain reasoning and identify information used to support decisions
4.2 understand and apply the rights and responsibilities of citizenship in Missouri and the United States
4.3 analyze the duties and responsibilities of individuals in societies
4.4 recognize and practice honesty and integrity in academic work and in the workplace
4.5 develop, monitor and revise plans of action to meet deadlines and accomplish goals
4.6 identify tasks that require a coordinated effort and work with others to complete those tasks
4.7 identify and apply practices that preserve and enhance the safety and health of self and others
4.8 explore, prepare for and seek educational and job opportunities
KNOWLEDGE (CONTENT) STANDARDS

Communication Arts

In Communication Arts, students in Missouri public schools will acquire a solid foundation that includes knowledge of and proficiency in:

CA1 speaking and writing standard English (including grammar, usage, punctuation, spelling, capitalization)
CA2 reading and evaluation fiction, poetry and drama
CA3 reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)
CA4 writing formally (such as reports, narratives, essays) and informally (such as outlines, notes)
CA5 comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as storytelling, debates, lectures, multimedia productions)
CA6 participating in formal and informal presentations and discussions of issues and ideas
CA7 identifying and evaluating relationships between language and culture.

Fine Arts

In Fine Arts, students in Missouri public schools will acquire a solid foundation that includes knowledge of:

FA1 process and techniques for the production, exhibition or performance of one or more of the visual or performed arts
FA2 the principles and elements of different art forms
FA3 the vocabulary to explain perceptions about and evaluations of works in dance, music, theater and visual arts
FA4 interrelationships of visual and performing arts and the relationships of the arts to other disciplines
FA5 visual and performing arts in historical and cultural contexts

Health/Physical Education

In Health/Physical Education, students in Missouri public schools will acquire a solid foundation that includes knowledge of:

HP1 structures of, functions of, and relationships among human body systems
HP2 principles and practices of physical and mental health (such as personal health habits, nutrition, stress management
HP3 diseases and methods for prevention, treatment and control
HP4 principles of movement and physical fitness
HP5 methods used to assess health, reduce risk factor, and avoid high risk behaviors (such as violence, tobacco, alcohol and other drug use)
HP6 consumer health issues (such as the effects of mass media and technologies on safety and health)
HP7 responses to emergency situations
Mathematics

In Mathematics, students in Missouri public schools will acquire a solid foundation that includes knowledge of
MA1 addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations
MA2 geometric and spatial sense involving measurement (including length, area, volume), trigonometry, and similarity and transformations of shapes
MA3 data analysis, probability and statistics
MA4 patterns and relationships within and among functions and algebraic, geometric and trigonometric concepts
MA5 mathematical systems (including real numbers, whole numbers, integers, fractions), geometry, and number theory (including primes, factors, multiples)
MA6 discrete mathematics (such as graph theory, counting techniques, matrices)

Science

In Science, students in Missouri public schools will acquire a solid foundation that includes knowledge of
SC1 properties and principles of matter and energy
SC2 properties and principles of force and motion
SC3 characteristics and interactions of living organisms
SC4 changes in ecosystems and interactions of organisms with their environments
SC5 processes (such as plate movement, water cycle, airflow), and interactions of Earth’s biosphere, atmosphere, lithosphere, and hydrosphere
SC6 composition and structure of the universe and the motions of the objects within it
SC7 processes of scientific inquiry (such as formulating and testing hypotheses)
SC8 impact of science, technology, and human activity on resources and the environment

Social Studies

In Social Studies, students in Missouri public schools will acquire a solid foundation that includes knowledge of
SS 1 principles expressed in the documents shaping constitutional democracy in the United States
SS2 continuity and change in the history of Missouri, the United States and the world
SS3 principles and processes of governance systems
SS4 economic concepts (including productivity and the market system) and principles (including the laws of supply and demand)
SS5 the major elements of geographical study and analysis (such as location, place, movement, regions) and their relationships to changes in society and environment
SS6 relationships of the individual and groups to institutions and cultural traditions
SS7 the use of tools of social inquiry (such as surveys, statistics, maps, documents)
National Technology Education Content Standards (TES)

The Nature of Technology

Standard 1  Students will develop an understanding of the characteristics and scope of technology.

Standard 2  Students will develop an understanding of the core concepts of technology.

Standard 3  Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.

Technology and Society

Standard 4  Students will develop an understanding of the cultural, social, economic, and political effects of technology.

Standard 5  Students will develop an understanding of the effects of technology on the environment.

Standard 6  Students will develop an understanding of the role of society in the development and use of technology.

Standard 7  Students will develop an understanding of the influence of technology on history.

Design

Standard 8  Students will develop an understanding of the attributes of design.

Standard 9  Students will develop an understanding of engineering design.

Standard 10 Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.

Abilities for a Technological World

Standard 11 Students will develop abilities to apply the design process.

Standard 12 Students will develop abilities to use and maintain technological products and systems.

Standard 13 Students will develop abilities to assess the impact of products and systems.
The Designed World

Standard 14  Students will develop an understanding of and be able to select and use medical technologies.

Standard 15  Students will develop an understanding of and be able to select and use agricultural and related biotechnologies.

Standard 16  Students will develop an understanding of and be able to select and use energy and power technologies.

Standard 17  Students will develop an understanding of and be able to select and use information and communication technologies.

Standard 18  Students will develop an understanding of and be able to select and use transportation technologies.

Standard 19  Students will develop an understanding of and be able to select and use manufacturing technologies.

Standard 20  Students will develop an understanding of and be able to select and use construction technologies.