Bloomfield Public Schools
Bloomfield, New Jersey 07003

Curriculum Guide

Drafting/Computer Aided Design I
Grades 9-12

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DRAFTING/COMPUTER AIDED DESIGN

Drafting/Computer Aided Design is a constantly evolving field which affects the way everyday products are designed, prototyped, and manufactured. Students enrolled in CAD I become proficient with various CAD functions, terminology, and career opportunities in related fields. Each participant will demonstrate the safe operation of tools, computer equipment, and plotters in their quest to design and analyze solutions to real-world problems within time constraints. Students will create computer-generated single view, orthographic, isometric, and three-dimensional drawings in preparation for advanced high school and post-secondary education programs and/or industry.

This course is a one year, five-credit course designed for students who may be considering post-secondary training in related areas. The course is focused on the principals, concepts and the use of graphic tools used in the field of architecture, structural systems and construction trades. This program will provide an understanding of construction methods and basic drawing fundamentals. The students will prepare working drawings including the creation of floor plans, foundation plans, basic roof plans, wall sections and elevation drawings using traditional, as well as computer-assisted design (CAD) methods. The students learn by developing residential plans and constructing models/prototypes. This course will increase the students' awareness of construction and design. Students will be able to communicate architectural ideas in an understandable, efficient, and accurate manner.

The classroom being used for this course is evolving into a fully functioning CAD lab. The latest version of software has been installed on 20 new pc's that were put in place specifically to support the CAD software being used in the program. While the goals established are relevant to any Drafting or Computer Aided Design curriculum, the computer program being used in the course are Pro-Desktop; Chief Architect and AutoCAD. The lab also has a Smartboard; plotter and printers for student use.

Relevant Standards[1]	Enduring Understandings	Essential Questions	Assessments		
			Diagnostic (before)	Formative (during)	Summative (after)
9.1.12.F.1 9.3.12.C.1,2,5,6, 11-13 9.4.12.O.38-45	Self-management is a key to maximizing efficiency and preventing accidents.	• What are some organizational skills? • How are organizational skills beneficial to an employee/employer relationship? • Why is time management important? • Why are safety precautions important in the workplace?	Do Now Ice Breaker Pretest Student Survey Oral Questions / Discussion Anticipatory Set Questions	Quizzes Chapter Test Written Assignments Oral Presentations Observations Participatory Rubrics Role Play Interview s Journals Research Assignments	Portfolios Self and Peer Assessment Performance Assessment Mid Terms Final Exam Projects Based Learning – Rubric Assessmen t
9.1.12.C.1-6; D.1-3; E.5; F.1 9.3.12.C.14-24 9.4.12.O.1,13-18, 22,29-33,36,46-51,67,68	Working with other people is an important skill for life and the workplace.	• What characteristics are essential to a functional team? • What are the benefits of working in a team environment as opposed to individually? • How do inappropriate behaviors and characteristics affect productivity?			
8.1.A.12.1 8.1.12.F.2 9.4.12.O.58; O(1).9-10	Knowing how to create, save, retrieve, and produce electronic work is essential in the work place.	• How is work done on a computer created and stored? • What is the benefit of a computer network? • What is the purpose of various file types?			
8.2.12.B.1-3; C. 1-3; D.1; E.1 9.4.12.0(1).11-12	The design/engineering process is a series of steps taken in order to create a product or	• What are the components of the design/engineering process? • How is the design/engineering process carried out, and what are the steps? • How is a final product affected by the design/engineering process?			
8.1.12.A.2 8.2.12.F.3 9.4.12.O(1).2,5,8 -12	Proficiencies with various tools and menus of a computer program will greatly assist the efficiency of	• How do sketches play a role in creating a solid model? • How does a CAD program help you create a design? • What part of the CAD editing program helps you create the changes? • How can one navigate through the various options of a CAD program?			
9.4.12.B.6, 18, 24, 8.1.12.C.1, F.2; 8.2.12.G.1,	Innovation in digital tools and products are utilized to aid and simplify work.	• What is the difference between using your hand to drawn design as opposed to a computer? • What is the difference between using your hand to alter a design as opposed to altering it digitally? • Who is known as a major contributor in CAD? • What are the benefits of digital CAD technology in product development?			

Relevant Standards[1]	Enduring Understandings	Essential Questions	Assessments		
			Diagnostic (before)	Formative (during)	Summative (after)
8.2.12.F.1, 3, 9.4.12.B(1).9, 75, 5.1.12.B.2	CAD requires knowledge of proper technique.	• What are the basic CAD terminologies for creating models? • What are some of the key features that should be understood when designing a product? • Why is it important to follow proper procedure in creating a model? • How does proper dimensioning affect a product? • How do various parts come together to form sub assemblies? • What are the key features in renderings? • Why is it important to know various file types?	Do Now Pretest Student Survey Oral Questions / Discussion Anticipatory Set Questions	Journals Quizzes Chapter Test Observations Participatory Rubrics Interviews Written Assignments Oral Presentations Research Assignments	Portfolios Projects Based Learning – Rubric Assessment Self and Peer Assessment Performance Assessment Mid Terms Final Exam
9.4.12.B(1).1, 2, 15; 9.1.12.D.3, 8.1.12.C.1, 8.2.12.B.1, 2	CAD programs allow products to be presented to clients prior to production.	• Why are presentations important? • How is a product presentation conducted? • What are some ways in which CAD models can be presented to clients?			
9.4.12.B(1).1, 9, 5.1.12.B.2, 8.2.12.A.1, B.1, 2	CAD programs are fundamental to the development of technological products.	• How has the timeline of product development been affected by CAD technologies? • What is the difference between CAD and CAM? • Why is it important to know how to use CAD CAM Software together? • How is rapid prototyping used in the development of a product?			
9.4.12.B(1).7, 54-58, C.55, 9.1.8.E.4, 8.1.12.D.2	Use of various designs and information adheres to legal and ethical laws.	• What are the consequences of copying and pasting other peoples work without permission? • What ethical guidelines need to be followed when producing ideas and designs? • Why are patents important in the development of technological products and systems?			

Unit Title	Unit Understandings and Goals
Unit 1: Teamwork, Self Management, and Health & Safety	**Self-management is a key to maximizing efficiency and preventing accidents.** **Working with other people is an important skill for life and the workplace.** • **Students will be able to identify and implement proper safety in a work environment.** • **Students will also understand the importance of collaboration and effective teamwork skills.**
Unit 2: Introduction to Design	**The design/engineering process is a series of steps taken in order to create a product or solve a problem.** **Innovation in digital tools and products are utilized to aid and simplify work.** **CAD programs are fundamental to the development of technological products. Use of various designs and information adheres to legal and ethical laws.** • **Students will be able to demonstrate an understanding of the design/engineering process and put it into practice.** • **Students will be able to identify basic technical drawings and describe e their importance to the design/engineering process.** • **Students will be able to identify the impact and use of computer technology in product development.**
Unit 3: Sketching and Drawing	**The design process is a series of steps taken in order to create a product or solve a problem.** **Innovation in digital tools and products are utilized to aid and simplify work.** **CAD requires knowledge of proper technique.** • **Students will be able to demonstrate an understanding of various sketching techniques as well as drawing types.** • **Students will develop an appreciation for the use of computers in drafting and design work.** • **Students will be able to identify the early influences in CAD technology.**
Unit 4: CAD - History and Introduction	**Knowing how to create, save, retrieve, and produce electronic work is essential in the work place.** **Proficiencies with various tools and menus of a computer program will greatly assist the efficiency of work.** **Innovation in digital tools and products are utilized to aid and simplify work.** • **Students will understand the historical background that lead to the innovation of CAD and how it was first used.** • **Student will be able to identify the various menus, toolbars, windows, and work areas of the CAD program.** • **Students will also understand how to create specific file types, save file, and format preferences.**
Unit 5: Creating a Simple Model.	**Knowing how to create, save, retrieve, and produce electronic work is essential in the work place.** **The design process is a series of steps taken in order to create a product or solve a problem.** **Proficiencies with various tools and menus of a computer program will greatly assist the efficiency of work. Innovation in digital tools and products are utilized to aid and simplify work.** • **Students will understand the need to have a valid sketch prior to creating a solid.** • **Students will understand the concept of parametric modeling and shape before size.** • **Students will understand the importance of selecting the appropriate drawing plane.** • **Students will understand the primary extrude feature. Students will be able to troubleshoot common errors.**
Unit 6: Dimensions and Constraints	**Innovation in digital tools and products are utilized to aid and simplify work.** **Proficiencies with various tools and menus of a computer program will greatly assist the efficiency of work. CAD requires knowledge of proper technique.** • **Students will describe the importance of dimensioning and tolerances** • **Students will understand the interaction between sketching dimensions and the resulting solid mode, as well as geometric and parametric relationships.**

Unit 7: Engineering Drawing	**Knowing how to create, save, retrieve, and produce electronic work is essential in the work place.** **Innovation in digital tools and products are utilized to aid and simplify work.** **Proficiencies with various tools and menus of a computer program will greatly assist the efficiency of work. CAD requires knowledge of proper technique.** **CAD programs allow products to be presented to clients prior to production.** **• Students will be producing engineering drawings based on 3D models and parts.**
Unit 8: Drawing Output	**Knowing how to create, save, retrieve, and produce electronic work is essential in the workplace. Proficiencies with various tools and menus of a computer program will greatly assist the efficiency of work.** **• Students will understand how to format their drawings and models for out put to an assortment of printers and plotters.**
Unit 9: Patterns and Copies	**Proficiencies with various tools and menus of a computer program will greatly assist the efficiency of work.** **• Students will be able to duplicate and mirror visual objects within their design to create patterns and several instances of the same shape.**
Unit 10: Revolve	**Proficiencies with various tools and menus of a computer program will greatly assist the efficiency of work.** **• Students will be able to understand the relationship between a profile and the axis it is rotated about using revolve or a similar feature.**
Unit 11: Sweep/Loft	**Proficiencies with various tools and menus of a computer program will greatly assist the efficiency of work.** **• Students will be able to project a profile along a given path to create a new solid object that may be of an irregular shape.**
Unit 12: Rendering	**CAD programs allow products to be presented to clients prior to production.** **• Students will be able to apply materials and textures to a designed product to give it a realistic appearance for presentation.**
Unit 13: Assemblies	**Innovation in digital tools and products are utilized to aid and simplify work.** **The design process is a series of steps taken in order to create a product or solve a problem.** **• Students will be able to take multiple designed components and join them together within the program to make a complete final product.**
Unit 14: Rapid Prototyping	**Innovation in digital tools and products are utilized to aid and simplify work. CAD Programs are fundamental to the development of technological products.** **The design process is a series of steps taken in order to create a product or solve a problem.** **• Students will be able to create a design and then use a rapid prototyping method to create a tangible 3D model.**

Unit 15: Careers and Professionalism	**Working with other people is an important skill for life and the workplace. CAD programs allow products to be presented to clients prior to production.** **• Students will be able to create a final product using CAD/CAM software to quickly create a prototype of their ideas for presentation.**

GOALS and Behavioral Objectives

Goal 1: Safety Awareness in the Drafting and Architecture Studio*.

Objective (SWBAT)	Suggested Activity	Resources and Instructional Strategies	Assessment (of the objective)
1A. List safety rules for the design studio and the equipment found there. 1B. Locate dangerous areas or parts of equipment in lab and any emergency switches. 1C. Explain the need for safe conduct in class. 1D. Demonstrate safe use of tools, equipment and behavior. 1E. Apply safety rules to working environment. 1F. Take ergonomic and personal health concerns into account when considering CAD hardware and furniture. 1G. Describe the ergonomic and personal safety factors to be considered when setting up a CAD workstation.	1A. Read and discuss brochures and handouts related to safety rules. 1B. Conduct an interactive lecture and demonstration of equipment in studio -fill in room layout. 1C. Write a well-organized theme on classroom safety. -class debate 1D. Teacher to demonstrate tool and equipment operation. -Student to mimic use -Video of equipment features 1E. Students will follow criteria guidelines for acceptable levels of performance. 1F. Class discussion on the term ergonomics and how it applies to CAD workstations. Design a CAD workstation. 1G. Given an ergonomics project, select CAD furniture, and design a CAD workstation.	1A. Underwriters Laboratories and Insurance Companies pamphlets 1B. Equipment manuals -Design studio layout 1C. Teacher prepared information sheets and criteria 1D. Equipment manuals and videos 1E. Guest speaker: - Drafter -Architec 1F. Text resource: Mechanical Drawing, Board & CAD Techniques 2003 1G. CAD furniture catalogs	1A. Students will achieve a minimum of 100% on written tests or quizzes. 1B. Completed design studio layout highlighting danger zones. 1C. Completed writing exercise evaluated for thoroughness. 1D. Proper student conduct in the design studio. 1E. Teacher observation of student practical performance 1F. Performance on design problem meeting all criteria. 1G. Completed report on ergonomic requirements of a CAD workstation.

*A general safety introduction is given in the beginning of each course. Additional emphasis is integrated throughout the curriculum in every unit and at times most effective and appropriate.

Goal 2: Skillful Use and Identification of Common Drafting Tools and Equipment.

Objective (SWBAT)	Suggested Activity	Resources and Instructional Strategies	Assessment (of the objective)
2A. Identify the names of the equipment found in the design studio.	2A. Participate in a scavenger hunt to locate each piece of equipment and fill in a diagram to identify them.	2A. Resource text: <u>The Use and Care of Drafting Equipment</u> -Applicable videos	2A. Completed scavenger hunt worksheet with 75% minimum recognition.
2B. List the features of each piece of equipment.	2B. Read equipment manuals and discuss their purpose.	2B. Teacher prepared diagrams, charts and instructions	2B. Contest performance results by teams.
2C. Explain how the drafting machine eliminates the need for some of the individual pieces of equipment.	2C. Compare and contrast the drafting machine to the equipment alternatives.	2C. Guest speaker from local architectural firm. Topics: How they perform their jobs and equipment used	2C. Completed chart of equipment comparisons. • Completed speaker summary form.
2D. Demonstrate vocabulary mastery and recognition. -Application to the work setting	2D. Architecture & drafting terminology "Jeopardy" game to reinforce terms, prefixes, and root words.	2D. Teacher directed "Jeopardy" game -Internet	2D. Passing of tests and quizzes with 75% accuracy.
2E. Prepare a drawing sheet for a technical drawing.	2E. Choose the drawing sheets, fasten it to the board, and layout the sheet using proper board drafting techniques.	2E. ANSI and ISO	2E. Demonstration of board drafting skills. 2F. Completion of a template drawing.
2F. Work with drafting pencils.	2F. Practice sharpening pencils properly and: -Demonstrate proper position of technical pens and pencils. -Practice inking and erasing.	2F. Text: Chapter on "Basic Drafting Techniques"	

Goal 3: Understand the Purpose of the Different Drawing Representations Commonly Used in Drafting.

Objective (SWBAT)	Suggested Activity	Resources and Instructional Strategies	Assessment (of the objective)
3A. Explain the necessity for sketching and the equipment used to produce sketches.	3A. Class to work on textbook activities -Ideation -Refinement -Implementation	3A. Text: Chapter on "Design and Sketching"	3A. Completed teacher prepared worksheets with 80% accuracy.
3B. List the <u>four</u> elements of a sketch.	3B. Review previous works of applied sketching and discuss its development. -Locate points of an object on sketches provided	3B. Static and moving models -Prepared instructional sketches	3B. Class participation in identifying sketch elements.
3C. Demonstrate sketching techniques on a teacher assigned project. -Calculate the space needed to letter a title block -Construct a title block using the assigned lettering style -Alphabet of lines -Measurements of a line -Follow rules of sketching	3C. Teacher assigned project requiring examples of different mediums used in sketching. -Practice sketching and estimating proportions -Use a variety of drawing instruments -Increased order of problem difficulty	3C. Professional magazines -Sweet's Catalog -Previously graded sketches	3C. Submission of lab work evaluated by: 1. teacher 2. self 3. peer
3D. Apply the techniques of scale operation to assigned worksheets.	3D. Performance rating activities: -Three customary inch scale variations associated with drafting. -Draw an item to scale to properly fit the paper provided. -Identify from diagrams provided the four types of beveled scales -Calculate selected points on the scale when measurements are given. -Construct a drawing that requires a scale change to be visible.	3D. Alternate classroom reading experiences: -Owner's manuals -Drafting texts -Architectural manuals	3D. Completion of all practical exercises using imagination and creativity with a minimum of 65% accuracy overall.

Goal 4: Identify, Describe, and Construct Various Geometric Shapes and Constructions Used by Drafters.

Objective (SWBAT)	Suggested Activity	Resources and Instructional Strategies	Assessment (of the objective)

4A. Describe the importance of geometry in drafting. -Instrument techniques -Geometric Constructions	4A. Construct a right angle demonstrating an understanding of Pythagorean's Theorem. -List the equipment used in the construction of most geometric shapes. -Explain how the Egyptians were able to construct a right angle.	4A. Models of geometric shapes -Geometry text used by Mathematics Department	4A. Completed list of equipment and a brief report with assigned specifications.
4B. Draw a geometric construction.	4B. Using teacher prepared worksheets, draw a geometric construction. -Identify the geometric shapes by their proper names. -Locate the points of tangency on the worksheets. -Calculate angles created when combining angles of two triangles.	4B. Geometry worksheets -CAD program	4B. Complete worksheets and drawing evaluated in groups and by teacher.
4C. Apply the techniques of geometry to enlarge or reduce a geometric shape to scale.	4C. Student groups will work on assignments to both enlarge and reduce a geometric shape to scale.	4C. High school geometry text -Geometry worksheets	4C. Accurate, clear, legible, and neat constructions.
4D. Design a product similar to an illustration but enhancing to include more geometric shapes and colors.	4D. Create a design for an educational toy used to help toddlers develop manual dexterity, spatial relationships, and color association. Use distributed illustration to expand the item to include at least six geometric shapes of different colors. Material: 1" thick pine	4D. Text: Design problem 1 on p. 194 -Sample toys for toddlers	4D. Completion of a toy design to be used by the woods students to build and donate to the BHS Preschool.

Goal 5: Apply Multiview Drawing Principles.

Objective (SWBAT)	Suggested Activity	Resources and Instructional Strategies	Assessment (of the objective)

5A. Explain the relationship of orthographic projection to multiview drawing.	5A. Read chapter on "Multi-view Drawing" and write an essay to explain the relationship of orthographic projection to multiview drawing.	5A. Text: Chapter on "Multiview Drawing" -The Glass Box	5A. Completed essay on "The Relationship of Orthographic Projection to Multiview Drawing."
5B. Identify and create the various views used in orthographic drawings.	5B. Drafting problems from the text presented in order of difficulty from least to most difficult.	5B. Text: Chapter on "Multiview Drawing" -The Glass Box	5B. Practice drawings of each of the views.
5C. Locate multiple views on a drawing according to acceptable principles of drafting.	5C. Review of chapter topics: -Name six sides & six views -Name three normal views in a technical drawing -Differences between first- and third-angle projection -Transfer distances from front to top and side views	5C. Textbook problems	5C. Teacher observation of student performance.
5D. Develop a multiview drawing from the initial idea to a finished drawing using board drafting.	5D. Students will do independent practice on three problems drawing all necessary views of the objects shown.	5D. Textbook problems	5D. Achievement of a minimum of 65% on tests and quizzes.

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Goal 6: Demonstrate Proficiencies in the Two Basic Methods of Dimensioning and Identifying the Four Types of Lines Used in Dimensioning.

Objective (SWBAT)	Suggested Activity	Resources and Instructional Strategies	Assessment (of the objective)

6A. Demonstrate a knowledge of size description.	**6A. Place dimensions properly on a worksheet done independently.**	**6A. Computerized dimensioned drawing examples** **-Text resources** **-Teacher designed worksheet**	**6A. Completion of related worksheets.**
6B. Explain the reason for finish marks and how they are placed on a drawing.	**6B. Write a brief statement related to the topic and share with class.**	**6B. Reference books** **-Encyclopedia** **-Professional magazines** **-Graphic standards** **-CAD manuals**	**6B. Oral discussion participation.**
6C. Draw an example of each of the lines used in dimensioning.	**6C. Using an information sheet, apply the abbreviations used in dimensioning to replace words and draw the lines.** **-Locate surfaces requiring finish marks** **-Calculate the additional areas required to properly dimension**	**6C. "Dimensioning Packet"**	**6C. Finished drawing adhering to assignment requirements.**
6D. Identify the three organizations which set the standards for the latest standards information.	**6D. Research ANSI (American National Standards Institute) and report on its development and function.**	**6D. BHS Media Center** **-Internet**	**6D. Brief report on ANSI completed according to teacher guidelines.**

Goal 7: Apply Pictorial Drawing Principles.

Objective (SWBAT)	Suggested Activity	Resources and Instructional Strategies	Assessment (of the objective)

7A. Identify three distinct categories of pictorial drawings, and their general uses: **-Isometric** **-Oblique** **-Perspective**	**7A. Read "Pictorial Drawings" chapter and complete review questions at end of chapter.**	**7A. Textbook and "Pictorial Drawings" packet**	**7A. Performance on teacher prepared quiz.**
7B. Demonstrate an understanding of the relationship of isometric surfaces to corresponding orthographic surfaces.	**7B. Worksheet problems 1-15**	**7B. Resource texts in classroom.**	**7B. Teacher observation of student practical performance.**
7C. Determine an appropriate scale and create oblique drawings according to instructions.	**7C. Worksheet problems 16-21**	**7C. Textbook**	**7C. Completed drawings created with accuracy and precision.**
7D. Locate the reference points needed in plotting an irregular curve.	**7D. Individual student performances done for teacher evaluation.**	**7D. Teacher critiquing**	**7D. Teacher observation of student practical performance.**
7E. Construct one- and two-point perspective drawings considering line of sight, vanishing points and other items.	**7E. Teacher assigned technical problems.**	**7E. Textbook and other classroom resource materials**	**7E. Completed perspective drawings adhering to teacher guidelines.**
7F. Write a one-page narrative on why pictorials are an essential part of the graphic language.	**7F. Writing activity from teacher prepared copy.**	**7F. BHS Media Center** **- Internet resources**	**7F. Completed "convincing" narrative on assigned topic.**

Goal 8: Demonstrate Various Drawings Needed in a Complete Set of Architectural Working Drawings.

Objective (SWBAT)	Suggested Activity	Resources and Instructional Strategies	Assessment (of the objective)

8A. Name the types of drawings typically found in a set of working drawings.	8A. Listen to guest speakers, summarize their presentations and list the drawings found in working drawings.	8A. Guest speaker: -Architect -Interior Designer	8A. Completed list of drawings found in working drawings. - Completed guest speaker summary forms.
8B. Define neighborhoods and identify their functions.	8B. Prepare a definition and functions for -Neighborhood design -Public buildings -Urban development -Traffic patterns	8B. Municipal office representatives -Teacher prepared worksheets	8B. Completed exercises related to community architecture.
8C. Demonstrate an understanding of basic floor plans.	8C. Interpret a set of working drawings by labeling structural features and determining square footage of the house.	8C. Architectural Working Drawings examples	8C. Proper labeling of drawings.
8D. Choose an architectural style and illustrate a basic front elevation.	8D. Front elevation project	8D. Resource textbooks, Media Center, and Internet	8D. Submission of front elevation project evaluated by: 1. Self 2. Teacher 3. Peer

Goal 9: Apply Computer Aided Drafting Techniques.

Objective (SWBAT)	Suggested Activity	Resources and Instructional Strategies	Assessment (of the objective)

9A. Describe the hardware components of a CAD workstation.	**9A. Label and fill in the hardware components on a blank diagram.**	**9A. Teacher lecture and handouts**	**9A. Labeled CAD diagram.**
9B. Identify the three main types of CAD software. **-General purpose drafting software** **-Specialty software for architectural, electrical, and other special drafting needs** **-Third-party software**	**9B. Listen to guest speakers and summarize the presentations.**	**9B. Vendor guest speaker** **-AUTOCAD and architect**	**9B. Completed guest speaker summary form.**
9C. Create text appropriate for a mechanical drawing using a CAD system.	**9C. Practice several lettering styles making modification to style and size and the three commands that allow you to place text on a drawing.**	**9C. Software manuals**	**9C. Submitted CAD lettering practice exercises.**
9D. Produce a technical drawing using CAD.	**9D. Team Design Problem: Design a nightstand caddy to hold a watch, wallet, coins, jewelry, and other items. First sketch the idea, then prepare CAD drawings as assigned. Do not dimension.**	**9D. CAD instruction manual**	**9D. Completed CAD design applying skill & creativity.**

Goal 9: Apply Computer Aided Drafting Techniques.

Objective (SWBAT)	Suggested Activity	Resources and Instructional Strategies	Assessment (of the objective)

9E. Use a CAD system to add dimensions, notes, and geometric tolerances to a technical drawing.	**9E. Work as a team to design a two-wheeled scooter. Design it to fold flat for easy carrying and storage. Specify light-weighted materials and include list. Share responsibility in the completion of a set of plans.**	**9E. Teacher support and technical manuals**	**9E. Completed design sketches and set of plans.**
9F. Manipulate 3D models in CAD software to achieve isometric, oblique, and perspective views.	**9F. Assignment of chapter problems 1-29.**	**9F. Textbook and classroom resources**	**9F. Completed textbook exercises created with accuracy and precision.**

Goal 10: Career Awareness.

Objective (SWBAT)	Suggested Activity	Resources and Instructional Strategies	Assessment (of the objective)

10A. Compile five related occupations and research one preparing a three-page report.	**10A. Career report explaining training, personal traits, future prospects, salary etc. (Calculate take-home pay)** **-Visit Media Center for presentation by media specialist**	**10A.** **-Internet** **-Periodicals**	**10A. Completed career reports and an oral presentation.**
10B. Interview someone in a related occupation.	**10B. Distribute interview sheets, clarify assignment, have students select one or two of those interviewed and invite as guest speaker.**	**10B. Guest speaker representing one or two of the related professions**	**10B. Completed set of interview questions and guest speaker summary form.**
10C. Apply information gained about selected occupation and explain why or why not he/she will want to pursue such an occupation.	**10C. Schedule of student oral reports.**	**10C. Participation in Career Fair at BHS; interviewing exhibitors and visitors**	**10C. Oral presentation performance.**