NEW MILFORD PUBLIC SCHOOLS
New Milford, Connecticut

Architectural Drafting II

February 2015

New Milford's Mission Statement

The mission of the New Milford Public Schools, a collaborative partnership of students, educators, family and community, is to prepare each and every student to compete and excel in an ever-changing world, embrace challenges with vigor, respect and appreciate the worth of every human being, and contribute to society by providing effective instruction and dynamic curriculum, offering a wide range of valuable experiences, and inspiring students to pursue their dreams and aspirations.

Architectural Drafting II

This course is intended to be an extension of Architectural Drafting I with all its practices. Students will be required, through the use of computer-aided drafting (CAD), to complete instruction in mastering the AutoCAD commands, Internet access, and various customizing techniques. These topics are covered in an easy-to-understand sequence, and progress in a way that allows the student to become comfortable with the commands as their knowledge builds. Through the course students will be required to develop a set of house plans graphically using the CAD system. Class members review many basics covered in Architectural Drafting I, devoting class time to a more detailed and in-depth study of many of these basics.

Common Core State Standard Key

Connecticut Technology Education Standards

ARCH.05	Architecture Technology (Knowledge and Skills)
ARCH.0503	Architecture Technology (Knowledge and Skills)
ARCH.05.04	Architecture Technology (Knowledge and Skills)
ARCH.04	Architecture Technology (Knowledge and Skills)
ARCH.04.04	Architecture Technology (Knowledge and Skills)
ARCH.05.02	Architecture Technology (Knowledge and Skills)
ARCH.06.01	Architecture Technology (Knowledge and Skills)
ARCH.06.03	Architecture Technology (Knowledge and Skills)
ARCH.08.01	Architecture Technology (Knowledge and Skills)
CADD.04	CADD Knowledge and Skills
CADD.05.04	CADD Knowledge and Skills
EKS.05.05	Essential Knowledge and Skills
EKS.08	Essential Knowledge and Skills
EKS.05.06	Essential Knowledge and Skills
EKS.05.05	Essential Knowledge and Skills
EKS.05.05	Essential Knowledge and Skills
EKS.08.02	Essential Knowledge and Skills
EKS.09	Essential Knowledge and Skills
EKS.05.08	Essential Knowledge and Skills
EKS.05	Essential Knowledge and Skills

Pacing Guide

Unit #	Title	Weeks	Pages
1	Basic Residential Planning	3	7-8
2	Light Construction Principles	3	10-12
3	Typical Architectural Details	3	13-15
4	Review – Basic Commands	2	16-19
5	Review - Making Your Drawings Precise	2	20-22
6	Review - Drawing Organization and Information	2	23-25
7	Review - Creating More Complex Drawings	2	26-28
8	Review - Preparing to Print	1	29-31
9	Working Drawings of a Small Home	12	32-34
10	Residential Mechanical and Electrical Systems (using the CADD Software)	6	35-37

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Committee Member(s): Joe Neff Unit 1: Basic Residential Planning	Course/Subject: Architectural Drafting II Grade Level: 10-12 # of Weeks: 3

Identify Desired Results

Common Core State Standards

- Utilize commercial and residential suggestions and specifications to create functional floor plans. **ARCH.05.03**
- Utilize an architectural drawing to estimate the cost and the materials necessary for a project. **ARCH.05.04**

Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that …)	Essential Questions Inquiry used to explore generalizations
- Students will understand the following: - Use of a Planning Checklist - Determine the cost Limit of the House by the Budget - Review the restrictions and Legal Aspects of the Lot - Plan the House to Fit the Site - Choose the Appropriate Basic Structure	- What are some important requirements listed on a planning checklist? - If a family's income is $30,000 per year, determine how much they should spend on building a home. - Where would you go to find out the legal restrictions? - Define and explain contour lines.

Expected Performances
What students should know and be able to do

Students will know the following:
- Be able to develop a Planning Checklist
- Be able to determine the cost limit of the house by the budget
- Review the restrictions and legal aspects of the lot
- Plan the house to fit the site
- Choose the most appropriate basic structure

Students will be able to do the following:
- Develop a Planning checklist
- Determine the cost of the house
- Know the restrictions and legal aspects of the lot
- Fit the house on the site
- Choose the right basic structure for the site

Character Attribute(s)

- Responsibility
- Respect

Technology Competencies
• Students collaborate with peers and others to solve problems and to develop solutions using technology tools and resources.

Develop Teaching and Learning Plan	
Teaching Strategies: • Students are to read Chapter #6 in the textbook. Each student will develop a planning checklist. Once they have completed their list, they will present it to the class. • Teacher uses the data projector to show the students each planning list and open it up to class discussion. • Teacher uses active learning to help the students complete their assignments. By listening to the lecture and the handouts, students will begin work on completing their drawings. • Problem-Based Learning is a method that challenges students to "learn to learn" by working in groups to seek solutions to problems. The students will work in groups to complete the worksheets assigned. • Teacher will hand out worksheets to the group. When the worksheet is finished, the teacher will check the worksheet and then the students can move onto the next drawing.	Learning Activities: • Students will develop a planning checklist. • Students will determine the cost of building a home. • Students will be able to apply the restrictions and legal aspects to fit a given site • Draw a rough draft of a structure that fits the needs of the client and the site.

Assessments	
Performance Task(s) Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)	**Other Evidence** Application that is functional in a classroom context to evaluate student achievement of desired results
Goal: Enable students to understand the basic residential planning techniques **Role**: Instructor/Teacher **Audience**: Students in Architectural Drafting II **Situation**: Students are given directions on how to do the work. They must complete	• Students will create a planning checklist. • Students will determine the cost of building the structure. • Students will review the legal aspects for the site. • Students will complete a rough draft of the structure and the site. • Self Check: Basic residential planning (7 questions)

and turn in to show the teacher they understand the basic planning techniques

Product: Correct completion of planning checklist, list of restrictions, rough draft of structure and site

Standards for Success: Completion of worksheets using departmental rubrics | • Unit Quiz
• Observation of student work
• Planning checklist, list of restrictions, rough draft of site and type of building |

Suggested Resources
• Muller, Edward J., <u>Architectural Drawing and Light Construction</u>. Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1985
• Supplemental handouts
• Worksheets

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Committee Member(s): Joe Neff Unit 2: Light Construction Principles	Course/Subject: Architectural Drafting II Grade Level: 10-12 # of Weeks: 3

Identify Desired Results
Common Core State Standards

- Explain various forces that bear on, and within, structures. **ARCH.04**
- Demonstrate an understanding of static and dynamic loads as they relate to a structure. **ARCH.04.04**

Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that …)	**Essential Questions** Inquiry used to explore generalizations

- Students will understand the following:
   ○ Background information in knowing what to draw
   ○ Construction terminology
   ○ Footings and Foundations
   ○ Wood-Frame Construction
   ○ Plank-and-Beam Frame and Balloon Construction
   ○ Brick and Stone Veneer Construction
   ○ Solid Masonry and cavity Wall Construction
   ○ Roof Types and Roof Coverings
   ○ Exterior Finish Materials
   ○ Interior Finishes and Trim
   ○ Insulation, Vapor Barriers and Ventilation
	- What is a collar beam and explain its purpose?
	- What is a frost line? Find out what the frost line is in CT.
	- Calculate the weight of a square foot of asbestos shingles.
	- Where is a lintel block used? What is its function?
	- What is an areaway? Why is it important to have one?
	- Explain the differences between balloon frame construction, plank-and-beam construction, and platform frame construction.
	- What is a gable?
	- Explain the difference between a gambrel and a Dutch hip roof.

Expected Performances What students should know and be able to do

Students will know the following:
- Be able to develop a background in light construction methods
- Understand construction terminology
- Footings and foundations
- Differences between wood-frame, balloon and plank-and-beam construction
- How to use brick and stone veneer
- Different types of roof types and their strengths
- Different types of exterior finishes
- Interior finishes and trim used in home construction
- Different types of insulation

Students will be able to do the following:
- Not only "how to draw", but know "what to draw".
- Know construction terminology and know where to apply within a typical structure
- Draw footings and foundations
- Know the differences between balloon, plank-and-bean and wood-frame construction
- Draw both a brick and stone veneer detail
- Identify different types of roof types and their strengths
- Determine the best insulation needed in light construction

Character Attribute(s)

- Honesty
- Compassion

Technology Competencies

- Students collaborate with peers and others to solve problems and to develop solutions using technology tools and resources.

Develop Teaching and Learning Plan

Teaching Strategies:	Learning Activities:
- Divide the class into three groups. One group will read Chapter #7, section on foundations plan. Another group will read Chapter #7 the section on brick and stone veneer and the third group will read Chapter #7, the section on roof types. Each group will lecture to the rest of the class on their sections. - Teacher uses the data projector to show each group's section to the rest of the class. - Teacher uses active learning to help the students complete their assignments. By listening to the groups and the handouts, students will begin work on completing their drawings. - Problem-Based Learning is a method that challenges students to "learn to learn" by working in groups to seek solutions to problems. The students will work in groups to complete the worksheets assigned. - Teacher will hand out sample drawings to the group. When the	- Students will draw a foundation layout (footings and foundation wall). - Students will draw a sample brick and a stone veneer detail. - Students will be able to identify different types of roof types (quiz) - Identify the different R factors of insulations (quiz).

drawings are finished, the teacher will check the drawings.	

Assessments	
Performance Task(s) Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)	**Other Evidence** Application that is functional in a classroom context to evaluate student achievement of desired results
Goal: Enable students to understand the light construction principles **Role**: Instructor/Teacher **Audience**: Students in Architectural Drafting II **Situation**: Students are given directions on how to do the work. They must complete and turn in to show the teacher they understand light construction principles **Product**: Correct completion of drawings and quizzes. **Standards for Success**: Completion of drawings using departmental rubrics	• Students will create a foundation layout. • Students will draw a sample brick and stone veneer. • Students will take a quiz on roof types. • Students will take a quiz on insulation. • Self Check: Light Construction principles (10 questions) • Unit Quiz • Observation of student work • Drawings of foundation layout and brick and stone veneers and quizzes.

Suggested Resources
• Muller, Edward J., Architectural Drawing and Light Construction. Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1985 • Supplemental handouts • Drawings

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Committee Member(s): Joe Neff Unit 3: Typical Architectural Details	Course/Subject: Architectural Drafting II Grade Level: 10-12 # of Weeks: 3

Identify Desired Results
Common Core State Standards

- Produce preliminary designs, final sketches and presentation drawings. **ARCH.05.02**
- Identify, research, develop and explain architectural construction plans, drawings, diagrams, and specifications. **ARCH.06.01**

Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that …)	Essential Questions Inquiry used to explore generalizations

• Students will understand the following:
  o Be able to select the correct scale of details
  o Draw a typical wall detail
  o Indicate roof pitches on drawings
  o Draw windows and their representation
  o Draw doors and their representation
  o Draw a fireplace design and layout
  o Draw a stair deign and layout
	• What factors are used to determine the choice of scale when drawing details?
	• What information does a typical wall detail usually show?
	• In gable roof terminology, what is the difference between "span" and "run"?
	• Differentiate between a window sash and window frame.
	• What two dimensions are the most important in a stair design?
	• What dimensions are first selected in a fireplace design, and what should be the basis for their selection?

Expected Performances What students should know and be able to do

Students will know the following:
- Proper scale to use when drawing details
- How to draw a wall detail
- Indicate roof pitches
- Draw different types of windows and be able to identify them
- Draw different types of doors and be able to identify them
- Draw a fireplace detail
- Draw a stair detail

Students will be able to do the following:
- Select the proper scale of all details
- Draw a standard wall section
- Draw all of the different types of windows and sashes

- Draw all different types of doors and door jambs
- Draw a fireplace detail
- Be able to draw and identify all of the various types of stair layouts

Character Attribute(s)

- Perseverance
- Integrity

Technology Competencies

- Students collaborate with peers and others to solve problems and to develop solutions using technology tools and resources.

Develop Teaching and Learning Plan

Teaching Strategies:	Learning Activities:
- Each student will pick from a list of details to draw and explain to steps to the class. - Teacher uses the data projector to show each detail to the rest of the class. - Teacher uses active learning to help the students complete their assignments. By listening to the lecture and the handouts, students will begin work on completing their drawings. - Problem-Based Learning is a method that challenges students to "learn to learn" by working in groups to seek solutions to problems. The students will work in groups to complete the drawings assigned. - Teacher will hand out sample drawings to the group. When the drawings are finished, the teacher will check the drawings.	- Students will draw a standard wall section. - Students will draw all types of windows and sashes. - Students will draw all different types of doors with their jambs. - Students will a simple fireplace layout. - Students will be given a quiz on the different types of stair layouts. - Students will pick one stair layout and draw it. - Students will be given a quiz on the different types of roof pitches and cornices.

Assessments	
Performance Task(s) Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)	**Other Evidence** Application that is functional in a classroom context to evaluate student achievement of desired results
Goal: Enable students to understand architectural details **Role**: Instructor/Teacher **Audience**: Students in Architectural Drafting II **Situation**: Students are given directions on how to do the work. They must complete and turn in to show the teacher they understand light construction principles **Product**: Correct completion of drawings and quizzes **Standards for Success**: Completion of drawings using departmental rubrics	• Students will draw a standard wall detail. • Students will draw all different types of windows and sashes. • Students will take a quiz on roof pitches and cornices. • Students will take a quiz on roof pitches • Students will draw all types of doors and door jambs. • Students will draw a typical fireplace layout. • Students will draw one stair layout. • Self Check: Light Construction principles (10 questions) • Unit Quiz • Observation of student work • Drawings

Suggested Resources
• Muller, Edward J., <u>Architectural Drawing and Light Construction</u>. Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1985 • Supplemental handouts • Drawings • Quizzes

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Committee Member(s): Joe Neff Unit 4: Review – Basic Commands	Course/Subject: Architectural Drafting II Grade Level: 10-12 # of Weeks: 2
Identify Desired Results	
Common Core State Standards	

- Identify, describe, and utilize the basic hardware and operating systems used in AutoCAD. CADD.04
- Identify and demonstrate positive work behaviors and personal qualities needed to be employable. **EKS.08**

Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that …)	**Essential Questions** Inquiry used to explore generalizations
- Exploring AutoCAD by reviewing the following commands: - How to start AutoCAD - Be able to view details - Be able to exiting AutoCAD - Be able to use the user interface - Be able to use Pull-Down Menus - Be able to use the Toolbars - Be able to use the Tools palettes - Understand the Command Entry - Be able to create and save a Drawing File - Be able to opening a drawing - Understand the basic objects - Be able to create circles - Be able to create arcs - Draw ellipses - Draw donuts - Be able to draw rectangles - Be able to draw polygons - Students collaborate with peers and others to solve problems and to develop solutions using technology tools and resources	- How do you start AutoCAD? - How do you exit AutoCAD? - How do you move a toolbar? - What is a cascading menu? - What appears when you rest the pointer on a button contained in a toolbar? - Explain the purpose of the DONUT command?

Expected Performances
What students should know and be able to do

Students will know the following:
- The AutoCAD workspace and user interface
- Basic drawing, editing and viewing tools
- The organization of drawing objects on layers
- Inserting reusable symbols (blocks)
- Preparing a layout to be plotted
- Adding text, hatching, and dimensions

Students will be able to do the following:
- Start AutoCAD
- The basic layout of the AutoCAD screen
- Use the command line and keyboard with AutoCAD
- Use your pointing device in AutoCAD
- Open an existing drawing
- Use AutoCAD's Cartesian workspace
- Draw lines, rectangles, and circles
- Erase objects
- Draw with GRID, and SNAP
- View a drawing with Zoom and PAN
- Undo commands
- Save your work
- Exit AutoCAD

Character Attribute(s)

- Responsibility
- Respect

Technology Competencies

- Students collaborate with peers and others to solve problems and to develop solutions using technology tools and resources.

Develop Teaching and Learning Plan

Teaching Strategies:
- Teacher uses the "CALL and RESPONSE TECHNIQUE (the teacher asks a question about the various commands and the whole class calls out the answer in unison).
- Teacher uses the computer to show the command after the class has responded.
- Teacher uses active learning to help the students complete their assignments. Using the computer

Learning Activities:
- Students will practice commands using the keyboard.
- Students will practice using their pointing device.
- Students will use the Select File Dialog
- Using the Coordinate display to locate the position of various (X, Y) points in the drawing.
- Completion of drawings #1 - #4

and by listening to the lecture, students begin work on completing their drawings.

- Problem-Based Learning is a method that challenges students to "learn to learn" by working in groups to seek solutions to problems. The students will work in groups to complete the drawings assigned. (#1 - #4)
- Teacher will hand out drawing #1 to the group. When the drawing is finished, the teacher will check the drawing and then the students can move onto the next drawing.

Assessments	
Performance Task(s) Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)	**Other Evidence** Application that is functional in a classroom context to evaluate student achievement of desired results
Goal: Enable students to create a basic 2D drawing in AutoCAD **Role**: Instructor/Teacher **Audience**: Students in Architectural Drafting II **Situation**: Students are given drawings to complete that show the teacher they understand the basic command needed to complete the drawing **Product**: Correct completion of 2D drawings (#1 - #4) **Standards for Success**: Completion for drawing #1-#4 using departmental rubrics	- Students will review how to start, save and exit AutoCAD by completing drawing #1. - Students will review the basic layout of the AutoCAD screen. - Students will review how to use the command line and keyboard with AutoCAD by completing drawing #2. - Students will review how to use your pointing device in AutoCAD - review how to open an existing drawing by opening an saved drawing (drawings #1 & #2) - Students will review AutoCAD's Cartesian workspace by completing drawing #3 - Students will be able to draw lines, rectangles, and circles by completing drawing #4. - Students will be able erase objects by completing drawing #4 - Students will be able draw with GRID, and SNAP by completing drawing #4. - Students will be able view a

	drawing with Zoom and PAN by completing drawing #4
	• Students will be able undo commands by completing drawing #4
	• Self Check: Getting Started with AutoCAD (7 questions)
	• Unit quiz
	• Observation of student work
	• Finish drawings #1 - #4

Suggested Resources

- Muller, Edward J., <u>Architectural Drawing and Light Construction</u>. Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1985
- AutoCAD Desktop software
- Supplemental worksheets
- Drawings #1 - #4

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Committee Member(s): Joe Neff Unit 5: Review - Making Your Drawings More Precise	Course/Subject: Architectural Drafting II Grade Level: 10 - 12 # of Weeks: 2

Identify Desired Results

Common Core State Standards

- Evaluate ideas, proposals, and solutions to problems. **EKS. 05.05**
- Use the concepts of geometric construction in the development of design drawings. CADD.05.04

Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that …)	Essential Questions Inquiry used to explore generalizations
• Students will draw the following items with precision in AutoCAD: 　○ Using Object Snap 　○ Object Snap Overrides 　○ Polar Tracking Settings 　○ Object Snap Tracking • Students will make changes to the following objects in their drawings: 　○ Selecting Objects for Editing 　○ Moving Objects 　○ Copying Objects 　○ Rotating Objects 　○ Scaling Objects	• Why do we need to use Object Snap? • How would you set Polar tracking so it snaps to different degrees and what is the advantage of it? • What settings on the Status Bar need to be turned on to use Object Snap tracking? • MOVE, COPY, ROTATE, and SCALE all use a base point. What is a base point? • What are the basic steps when editing an object, regardless of command?

Expected Performances
What students should know and be able to do

Students will know the following:
- How to snap to exact points on objects using OSNAP
- How to use object snap overrides
- How to draw lines at specific angles with Polar tracking
- How to specify distances with Polar Snap
- How to find exact locations with Object Snap Tracking
- How to select objects for editing
- How to move objects
- How to copy objects
- How to rotate objects
- How to scale objects

Students will be able to do the following:
- Set Object Snaps and use them to draw a fence line and rooflines.
- Use a variety of Object Snaps in conjunction with the LINE and CIRCLE commands.

- Use the Parallel and Extension object snaps.
- Adjust the Polar Tracking settings.
- Use Object Snap Tracking to draw process lines in a schematic diagram.
- Use several techniques to select objects for use of the ERASE command.
- Use the MOVE command.
- Use the COPY command.
- Use the ROTATE command.
- Use the COPY and SCALE command.

Character Attribute(s)

- Honesty
- Cooperation

Technology Competencies

- Identify, describe, and utilize the basic hardware and operating systems used in CADD.

Develop Teaching and Learning Plan

Teaching Strategies:

- "DO NOW" technique. Teacher writes on the board the commands that the students have to perform during class. Students look at the commands on the board and get to work completing the commands. As they finish, the teacher checks the command off on the worksheet
- Teacher will assign drawings for students to do using the basic editing commands
- Teacher will give the students exercises that demonstrate how to use the various commands
- Teacher will integrate technology by having the students use the computer and software to complete the assignments (drawings #9 - #14)

Learning Activities:

- Students will create a top view of a part by tracking the locations from the existing front and side views
- Students will use Object Snap Tracking to draw process lines
- Students will use several techniques to select objects for use with the ERASE command
- Students will use the MOVE command to place furniture into position in a floor plan
- Students will rotate a chair and PC and then COPY the entire set of furniture to other locations

Assessments	
Performance Task(s) Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)	**Other Evidence** Application that is functional in a classroom context to evaluate student achievement of desired results
Goal: Enable students to create a basic 2D drawing in AutoCAD **Role**: Instructor/Teacher **Audience**: Students in Architectural Drafting II classes **Situation**: Students are given drawings to complete that show the teacher they understand the basic command needed to complete the drawing **Product**: Correct completion of 2D drawings (#5 & #6) **Standards for Success**: Completion for drawing #5 & #6 using departmental rubrics	• Students will create a top view of a part by tracking the locations from the existing front and side views (drawing #5) • Students will use Object Snap Tracking to draw process lines by completing drawing #5. • Students will use several techniques to select objects for use with the ERASE command by completing drawing #5 • Students will use the MOVE command to place furniture into position in a floor plan by completing drawing #6 • Students will rotate a chair and PC and then COPY the entire set of furniture to other locations by completing drawing # 5 & #6. • Self-Check: Making Changes to Your Drawing (4 questions) • Unit quiz • Observation of student work • Completion of drawings #5 & #6

Suggested Resources

- AutoCAD Desktop software
- Muller, Edward J., <u>Architectural Drawing and Light Construction</u>. Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1985
- Supplemental worksheets
- Drawings #5 & #6

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Committee Member(s): Joe Neff Unit 6: Review - Drawing Organization and Information	Course/Subject: Architectural Drafting II Grade Level: 10-12 # of Weeks: 2

Identify Desired Results

Common Core State Standards

- Differentiate the various techniques for viewing objects. **CADD.05.03**
- Demonstrate flexibility and willingness to learn new knowledge and skills. **EKS.08.02**

Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that …)	Essential Questions Inquiry used to explore generalizations
- Students will be able to create new drawings with templates - Students will be able to use layers to organize their drawings - Students will be able to change the layer of an object - Students will be able to draw an arc ten different ways - Students will be able to draw polylines by using both width and length - Students will be able to convert polylines to lines and arcs - Students will be able to measure distances - Students will be able to measure areas - Students will have information about objects	- Why do we need different ways to draw arcs? - Why do we need polylines and how are they different from standard li9nes? - What does EXPLODE command do and why do we need it? - What is the difference between a layer that is frozen and a layer that is off? - Why would we want to move an existing object to a different layer?

Expected Performances
What students should know and be able to do

Students will know the following:
- How to create a new drawing with template
- How to make a layer current
- How to draw on specific layers
- How to control the state of a layer
- How to change the layer of an object
- Be able to draw arcs ten different ways
- Be able to draw polylines three different ways
- How to convert polylines to lines and arcs
- How to convert line and arcs to polylines

Students will be able to do the following:
- Use the dialog to select a template
- Set the current layer
- Change an object's layer
- Organize a drawing with layers
- Draw arcs
- Draw polylines
- Convert polylines to arcs and lines
- Convert arcs and lines to polylines

Character Attribute(s)

- Perseverance
- Respect

Technology Competencies

- Analyze the use of current CADD design technology. (CADD.02)

Develop Teaching and Learning Plan

Teaching Strategies:	Learning Activities:
- Teacher will lecture using the AutoCAD software showing the students the proper techniques for layering - Teacher will lecture on the proper commands used for drawing arcs, circles, and polylines - Teacher will use the data projector to summarize the various techniques used to complete the drawings assigned - Teacher will give the students exercises that demonstrate how to use the various commands - Students will together in small groups to show each other the proper commands needed to complete the assignments - Integrating Technology by using the computers to complete the assignments (drawings #7 - #9)	- Start drawings using different template files. - Change the state of layers using the icons in the toolbar. - Use the Layers toolbar and Match properties to move objects to different layers. - Draw door swings in a floor plan using the ARC command. - Construct several polylines as symbols to be used in a flow chart. - Edit polylines to join arcs and lines into a polyline and change the width. - Measure distances in a floor plan. - Find the areas of objects in a drawing. - Start a new drawing based on the MECH-INCHES DWG template.

Assessments

Performance Task(s) Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)	Other Evidence Application that is functional in a classroom context to evaluate student achievement of desired results
Goal: Enable students to create a basic 2D drawing in AutoCAD **Role**: Instructor/Teacher **Audience**: Students in Architectural Drafting II classes **Situation**: Students are given drawings to complete that show the teacher they understand the basic command needed to complete the drawing **Product**: Correct completion of 2D drawings (#7 - #9) **Standards for Success**: Completion for drawing #7-#9 using departmental rubrics	• Start drawings using different template files by opening a new drawing, drawing #7. • Change the state of layers using the icons in the toolbar by completing drawing #7. • Use the Layers toolbar and Match properties to move objects to different layers by completing drawing #16. • Draw door swings in a floor plan using the ARC command by competing drawing #8. • Construct several polylines as symbols to be used in a flow chart by completing drawing #8 • Edit polylines to join arcs and lines into a polyline and change the width by completing drawing #8. • Measure distances in a floor plan by completing drawing #9. • Find the areas of objects in a drawing by completing drawing #9. • Start a new drawing based on the MECH-INCHES DWG template by completing drawing #9. • Self-Check – Getting Information from your Drawing (8 questions) • Unit quiz • Observation of student work • Competeion of Drawings #7 - #9

Suggested Resources

- AutoCAD Desktop software
- Muller, Edward J., Architectural Drawing and Light Construction. Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1985
- Supplemental worksheets
- Drawings #7 - #9

New Milford Public Schools

Committee Member(s): Joe Neff Unit 7: Review - Creating More Complex Objects	Course/Subject: Architectural Drafting II Grade Level: 10-12 # of Weeks: 2

Identify Desired Results

Common Core State Standards

- Identify positive work-qualities typically desired in each career. **EKS.08.07**
- Guide individuals through the process of recognizing concerns and making informed decisions. **EKS.09**

Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that …)	Essential Questions Inquiry used to explore generalizations
- Students will know when to use the following advanced editing commands: - Trim and Extend - Stretch - Fillet and Chamfer - Students will be able to use the following duplication commands: - Offsetting - Mirroring - Arrays - Students will know what c\blocks are and how to insert them from the tool palette and with the insert command	- Why is it important to use the MIRROR command? - What are the two types of arrays you can create and explain the difference between both? - Why do we need to know how to insert blocks from the tool palette? - What are some advantages of using blocks? - What are the three methods that can be used to specify the dimensions of a chamfer? - What do you need to set before you apply a fillet in your drawing?

Expected Performances
What students should know and be able to do

Students will know the following:
- How to trim and extend objects
- How to stretch objects
- Fillet and chamfer objects
- Offset objects
- Mirror objects
- How to create arrays of objects
- What blocks are
- How to insert blocks using the Tool Palettes window
- How to insert blocks with the INSERT command

Students will be able to do the following:
- Use the TRIM command

- Use the EXTEND and TRIM command to complete drawings
- Use the STRETCH command to increase the size of an object
- Use the FILLET command to round the outer corners of an object
- Use the CHAMFER commands to create angled corners on an object
- Use OFFSET to construct parallel or concentric objects
- Use MIRROR to duplicate the other half of an object
- Create an rectangular and polar ARRAY
- Insert a block from the tools palettes

Character Attribute(s)

- Cooperation
- Responsibility

Technology Competencies

- Identify, describe, and utilize the basic hardware and operating systems used in CADD
- Define and apply computer technology

Develop Teaching and Learning Plan

Teaching Strategies:
- Teacher will lecture on the proper use of advanced editing commands
- After the teacher lecture, each student will pick a command and using the teacher's computer and the data projector, demonstrate to the class the proper editing command.
- Collaborative/Cooperative learning where the students work together in small groups to accomplish the goal of advanced editing techniques
- Inquiry-Guided Learning helps students build research skills from what they have already learned
- Teacher will use the data projector to show the students how to use the advanced editing skills
- Teacher will hand out drawings #10 - #12 to complete in class using the advanced editing techniques

Learning Activities:
- Students will use the TRIM and EXTEND command to complete a drawing.
- Students will use the STRETCH command to increase the width of a drawing.
- Students will use FILLET to round the outer corners of a part with two different radius sizes.
- Students will use the CHAMFER command with several different distances to create angled edges on a part.
- Students will use OFFSET on polylines, lines, and arcs to create walls and steps. Use rectangular and polar ARRAY to make copies of the workstation.
- Students will add furniture blocks from the tools palettes window into a floor plan
- Self Check: Creating Complex Objects (8 questions)
- Unit quiz
- Observation of student work
- Completion of Drawings # 10 - #12

Assessments

Performance Task(s) Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)	Other Evidence Application that is functional in a classroom context to evaluate student achievement of desired results
Goal: Using drawing organization and information to create more complex drawings. **Role**: Instructor/Teacher **Audience**: Students in Architectural Drafting II classes **Situation**: Students are given drawings to complete that show the teacher they understand the more complex commands needed to complete the drawings **Product**: Correct completion of 2D drawings (#10 - #12) **Standards for Success**: Completion for drawing #10-#12 using departmental rubrics	- Use the TRIM command by completing drawing #10. - Use the TRIM and EXTEND command to complete a drawing by completing drawing #10. - Use the STRETCH command to increase the width of a drawing by completing drawing #11. - Use FILLET to round the outer corners of a part with two different radius sizes by completing drawing #11. - Use the CHAMFER command with several different distances to create angled edges on a part by completing drawing #11. - Use OFFSET on polylines, lines, and arcs to create walls and steps. Use rectangular and polar ARRAY to make copies of the workstation by completing drawing #12. - You will add furniture blocks from the tools palettes window into a floor plan by completing drawing #12.

Suggested Resources

- AutoCAD Desktop software
- Supplemental worksheets
- Muller, Edward J., Architectural Drawing and Light Construction. Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1985
- Drawings #10 - #12

New Milford Public Schools

Committee Member(s): Joe Neff Unit 8: Review - Preparing to Print	Course/Subject: Architectural Drafting II Grade Level: 10-12 # of Weeks: 1

Identify Desired Results

Common Core State Standards

- Critically analyze information to determine value to the problem-solving task. **EKS.05.08**
- Employ critical thinking skills independently and in teams to solve problems and make decisions (e.g. analyze, synthesize and evaluate). **EKS.05**

Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that …)	Essential Questions Inquiry used to explore generalizations
- Setting Up a Layout involves the following steps: - Printing Concepts - Working in Layouts - Paper Space and Model Space - Creating and Scaling Viewports - Creating a New Layout - Copying a Layout - Guidelines for Layouts - Printing Your Drawing includes the following: - PLOT command - Plot Settings - Plot Preview	- How many different layouts are in AutoCAD? - Why do we need both Paper Space and Model Space? - What are the differences between working in Paper Space and Model Space? - How do you know what scale should you use in the Plot Scale area of the Plot Dialog box? Explain? - Are setting such as paper size and plot orientation saved with the drawing, saved with the layout, or not saved at all? - What are some key differences between plotting from the Model tab and plotting a layout?

Expected Performances
What students should know and be able to do

Students will know the following:
- How to switch between Paper Space and Model Space
- How to create viewports in a layout
- How to scale vewports
- How to manipulate viewports
- How to set up a new drawing
- How to copy a layout
- How to choose what to print or plot
- How to choose a plotter
- How to preview the printed drawing

Students will be able to do the following:
- Model space printing
- Paper space layout printing
- Working in layouts
- Switch between Paper Space and Model Space
- Create, scale and manipulate viewports
- Create and copy a layout
- Use the PLOT command
- Preview the PLOT

Character Attribute(s)

- Courage
- Cooperation

Technology Competencies

- Organize and provide a compact disc, web site and/or other digital media for use in demonstrating knowledge, skills, and experience.
- Define and apply computer technology.

Develop Teaching and Learning Plan

Teaching Strategies:	Learning Strategies:
- Teacher will lecture on how to prepare to print. - Teacher will lecture on layouts: paper space, model space, viewports, and settings. - Teacher will give the students exercises that demonstrate how to use the various commands - Teacher will explain how to do a print preview. - Teacher will use the data projector to show the students how to print - Critical Thinking-by completing the drawings (#13-#15) it will help the students understand the commands and help them to clarify what was taught. - Active Learning-working on drawings, doing hands-on, which helps the student understand the information and develops critical thinking - Teacher will hand out drawings #13 - #15 to complete in class using the advanced editing techniques	- Students will view the difference between Model Space and layouts - Students will create, scale, and lock viewports in a layout. - Students will create two new layouts: one based on an existing page setup, and another based on a new page setup that you define. - Students will copy an existing layout and modify the copy. - Students will plot a layout to a file. - Students will be able to set up a drawing in a new layout. You will create and scale viewports and adjust the view in each viewport.

- Problem-Based Learning-by giving the students drawings to complete to show the teacher that they understand the commands.

Assessments

Performance Task(s) Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)	Other Evidence Application that is functional in a classroom context to evaluate student achievement of desired results
Goal: Enable students to create a basic 2D drawing in AutoCAD **Role**: Instructor/Teacher **Audience**: Students in Architectural Drafting III classes **Situation**: Students are given drawings to complete that show the teacher they understand the basic command needed to complete the drawing **Product**: Correct completion of 2D drawings (#13 - #15) **Standards for Success**: Completion for drawing #13-#15 using departmental rubrics	• Students will view the difference between Model Space and layouts • Students will create, scale, and lock viewports in a layout by completing drawings #13. • Students will create two new layouts: one based on an existing page setup, and another based on a new page setup that you define by completing drawing #13. • Students will copy an existing layout and modify the copy by completing drawing #14. • Students will plot a layout to a file by completing a drawing #15. • Students will be able to set up a drawing in a new layout. You will create and scale viewports and adjust the view in each viewport by completing drawings #13 - #15. • Self-Check: How to Print Your Drawing (10 questions) • Unit quiz • Observation of student work • Completion of Drawings #13 - #15

Suggested Resources

- AutoCAD Desktop software
- Muller, Edward J., Architectural Drawing and Light Construction. Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1985
- Supplemental worksheets
- Drawings #13 - #15

New Milford Public Schools

Committee Member(s): Joe Neff Unit #9: Working Drawings of a Small Home (using the CADD software)	Course/Subject: Architectural Drafting II Grade Level: 10-12 # of Weeks: 12

Identify Desired Results	
Common Core State Standards	
- Research, plan and design functional structure. **ARCH.05** - Utilize CADD software to produce technical drawings and architectural proposals. **ARCH.06.03**	

Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that …)	**Essential Questions** Inquiry used to explore generalizations
- Students will understand the following: - Start with the Floor Plan - Develop the Second Floor over the First-Floor Plan - Use the First-Floor Plan to Develop the Foundation (Basement) Plan - Project Elevations from the Floor Plan - Select Scales suitable to the Details - Draw Transverse and Longitudinal Sections - Draw Kitchen Details (Interior Elevations) - Draw Bathroom Details (Interior Elevations) - Draw Fixed Glass Details - Draw a Plot Plan that orients the House to the Lot	- When starting a floor plan, why is it necessary to begin with general shapes and lines? - What is meant by a "wet-wall"? - On wood frame construction drawings, why is it convenient for workers to have dimensions shown from the outside of exterior-wall studs to the centerlines of partitions? - Why are lengthy notes about construction commonly put in the specifications rather than on the working drawings? - Why is a floor plan more readable when symbol hatching has been used throughout the walls? - What does the term "unexcavated" mean when shown on part of a foundation plan? - What dimensions must necessarily be put on elevation views?

Expected Performances What students should know and be able to do	
Students will know the following: - Be able to develop a First Floor Plan - Be able to develop a Second Floor Plan using the First Floor plan - Be able to use the First Floor Plan to develop the Foundation Plan - Be able to project Elevations from the Floor Plan - Be able to draw Transverse and Longitudinal Sections - Be able to draw the Kitchen Details	

- Be able to draw Bathroom details
- Be able to draw Fixed-Glass Windows
- Be able to draw a Plot Plan on the Lot

Students will be able to do the following:
- Draw a First Floor Plan
- Draw a Second Floor Plan
- Draw a Foundation Plan
- Draw Elevations (Front, Back, Right and Left Sides)
- Draw Transverse and Longitudinal Sections
- Draw a Kitchen Detail
- Draw a Bathroom Detail
- Draw a Plot Plan

Character Attribute(s)
- Loyalty   - Cooperation

Technology Competencies
Students collaborate with peers and others to solve problems and to develop solutions using technology tools and resources.

Develop Teaching and Learning Plan	
Teaching Strategies: - Each student will use the internet to look up a basic set of house plans to understand the proper way to draw a working drawing. - Teacher uses active learning to help the students complete their assignments. By listening to the lecture and the handouts, students will begin work on completing their drawings. - Problem-Based Learning is a method that challenges students to "learn to learn" by working in groups to seek solutions to problems. The students will work in groups to complete the drawings assigned. - Teacher will hand out sample drawings to the group. When the drawing is finished, the teacher will check the drawing and then the students can move onto the next drawing.	Learning Activities: - Students will develop and draw a first floor plan. - Students will draw a second floor plan. - Students will draw a foundation plan. - Students will draw elevations (4). - Students will draw transverse and longitudinal sections. - Students will draw kitchen elevations. - Students will draw bathroom elevations. - Students will draw fixed-glass details. - Students will draw a plot plan.

Assessments	
Performance Task(s) Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)	**Other Evidence** Application that is functional in a classroom context to evaluate student achievement of desired results
Goal: Enable students to understand the working drawings of a small home **Role**: Instructor/Teacher Audience: Students in Architectural Drafting II **Situation**: Students are given directions on how to do the work. They must complete and turn in to show the teacher they understand the working drawings for a small home **Product**: Correct completion of all of the drawings. **Standards for Success**: Completion of drawings using departmental rubrics	• Students will draw a first floor plan. • Students will draw a second floor plan. • Students will draw a foundation plan. • Students will draw four elevations. • Students will draw transverse and longitudinal sections. • Students will draw kitchen details. • Students will draw bathroom details. • Students will draw fixed-glass details • Students will draw a plot plan. • Self Check: Working Drawings (25 questions) • Unit Quiz • Observation of student work • Set of drawings.
Suggested Resources	
• Muller, Edward J., <u>Architectural Drawing and Light Construction</u>. Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1985 • Supplemental handouts • Drawings • AutoCAD Desktop software	

New Milford Public Schools

Committee Member(s): Joe Neff Unit 10: Residential Mechanical and Electrical Systems (using the CADD software)	Course/Subject: Architectural Drafting II Grade Level: 10-12 # of Weeks: 6

Identify Desired Results	
Common Core State Standards	

- Research and collect data that relates to architectural drafting and design. **ARCH.08.01**
- Utilize CADD software to produce technical drawings and architectural proposals. **ARCH.06.03**

Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that …)	**Essential Questions** Inquiry used to explore generalizations
- Students will understand the following: - Heating and cooling systems - Architectural considerations for heating and cooling - Current heating systems - Air-conditioning methods - Load calculation and sizing of heating equipment - Sizing cooling systems - Locations of outlets in rooms - Solar equipment - Drawing the heating and/or cooling systems - Plumbing systems and drawings - Drawing the plumbing plan - Drawing the electrical plan	- In planning a residential heating system, what basic factors must be considered? - What are the advantages of the forced warm-air heating systems? The hydronic systems? The radiant systems? - Why has electricity become popular in a home-heating system? - What is the purpose of an outside thermostat? - What is the purpose of a soil trap in plumbing fixtures? - What size electrical service panel should be selected for a home of 2000 sq feet? - What is a "feeder" circuit?

Expected Performances
What students should know and be able to do

Students will know the following:
- Be able to develop a heating and cooling system for a home
- Know the different types of heating systems
- Air-conditioning methods
- Be able to determine load calculation and sizing of heating equipment
- Be able to locate outlets in rooms
- Be able to size cooling systems
- Different types of Solar equipment
- Be able to draw a heating and cooling plan
- Be able to draw a plumbing plan

Students will be able to do the following:
- Draw the heating and cooling plan
- Draw the plumbing plan
- Draw the electrical plan

Character Attribute(s)
- Loyalty   - Cooperation

Technology Competencies
Students collaborate with peers and others to solve problems and to develop solutions using technology tools and resources.

Develop Teaching and Learning Plan	
Teaching Strategies: - Teacher lectures on the proper way to draw mechanical and electrical systems. - Teacher uses the data projector to show the students the different types of working drawings "CHECK for UNDERSTANDING" The teacher will hand out a worksheet with all of the different types of plans listed. As the student completes the drawing, the teacher checks off the drawing on their worksheet. - Teacher uses active learning to help the students complete their assignments. By listening to the lecture and the handouts, students will begin work on completing their drawings. - Problem-Based Learning is a method that challenges students to "learn to learn" by working in groups to seek solutions to problems. The students will work in groups to complete the drawings assigned. - Teacher will hand out sample drawings to the group. When the drawing is finished, the teacher will check the drawing and then the students can move onto the next drawing.	Learning Activities: - Students will develop and draw a heating and cooling plan. - Students will draw a plumbing plan. - Students will draw an electrical plan.

Assessments	
Performance Task(s) Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)	**Other Evidence** Application that is functional in a classroom context to evaluate student achievement of desired results
Goal: Enable students to understand how to draw mechanical and electrical systems for a small home **Role**: Instructor/Teacher **Audience**: Students in Architectural Drafting II **Situation**: Students are given directions on how to do the work. They must complete and turn in to show the teacher they understand the working drawings for a small home **Product**: Correct completion of all of the drawings. **Standards for Success**: Completion of drawings using departmental rubrics	• Students will draw a heating and cooling plan. • Students will draw a plumbing plan. • Students will draw an electrical plan. • Self-Check: Mechanical and electrical systems. (20 questions) • Unit Quiz • Observation of student work • Set of drawings.

Suggested Resources
• Muller, Edward J., Architectural Drawing and Light Construction. Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1985 • Supplemental handouts • Drawings • AutoCAD Desktop software