

Black Horse Pike Regional School District
580 Erial Road, Blackwood, NJ 08012

Architectural Design

COURSE OF STUDY

Technology Department

Written by:
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Date:
June 2016

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Approved by:
Matt Szuchy, Director of Curriculum & Instruction

SYLLABUS

Architectural Design

Course Content

1. **Intro to Architectural Design** - This unit provides background information on the history and development of major architectural styles. It covers the basic principles and elements of architectural design. Basic Architectural Drafting Fundamentals will be introduced that provide basic information on the use of scales, drafting instruments, and CAD systems. Lastly, the student is presented the design process and drafting methods used to combine areas into composite, functional, and effective architectural plans. Procedures for designing and drawing floor plans, elevations, and sectional, detail, cabinetry, and site development drawings are explained.
2. **Basic Area Design** - This unit covers the environmental and functional design factors needed to plan specific areas of a structure. This includes the design considerations necessary for effective solar orientation, efficient energy use, and ergonomic and ecological planning. Major considerations include the function, location, decor, size, and shape of the various areas including: kitchen, living spaces, bathroom, bedrooms, outdoor spaces and utility areas.
3. **General Construction** – This unit begins with an overview of the basic scientific and modular principles upon which construction systems are based. Each major construction system will be explained as students are introduced to the specialized drawings needed to complete detailed descriptions of the structural design. Types of drawings included are those used to describe foundations and fireplaces and wood-frame, masonry, concrete, steel, and reinforced-concrete systems. This will also explain and shows in detail how to design and draw the framing systems for the major construction components of a building: floors, walls, and roofs.
4. **Working Architectural Drawings** – This unit includes the principles and procedures for preparing working drawings to describe the electrical, comfort-control (HVAC), and plumbing systems of a structure. Passive and active solar heating and cooling systems are also explained. It culminates by describing how architectural plans are checked and combined into sets and how drawings are interrelated to other drawings, details, and documents such as schedules, specifications, cost estimates, financial plans, codes, and contracts. A complete set of working drawings will be created. Lastly, the unit will cover the major career opportunities in architecture and construction, including information on preparing for a career in these fields.

Course Expectations and Skills

1. Keep and maintain an electronic portfolio.
2. Practice proper attitude and safe discipline.
3. Develop an industry standard of precision and quality in each activity.
4. Participate and contribute to group generated solutions.
5. Apply and analyze science and math related concepts to all activities.
6. Prepare for success in higher level technology courses and post-secondary education.

Resources: Hepler, Donald E., Paul Ross. Wallach, and Dana J. Hepler. Architecture: Drafting and Design. New York, NY: Glencoe/McGraw-Hill, 1998. Print.

Programs: Autodesk AutoCAD, Autodesk Revit

Grading Scale:

Unit Activity/Projects	50 percent
Written Work/Electronic Portfolio	25 percent
Class Participation	25 percent
	100 percent

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<p>Course/Unit Title:</p> <p>Architectural Design</p> <p><i>Unit 1:</i> <i>Intro to Architecture</i></p>	<p>Unit Summary:</p> <p>This unit provides background information on the history and development of major architectural styles, with excellent examples shown of both past and present designs. It covers the basic principles and elements of architectural design. Basic Architectural Drafting Fundamentals will be introduced that provides basic information on the use of scales, drafting instruments, and CAD systems and explains the various architectural drafting conventions used in creating working drawings. Lastly, the student is presented the design process and drafting methods used to combine areas into composite, functional, and effective architectural plans. Procedures for designing and drawing floor plans, elevations, and sectional, detail, cabinetry, and site development drawings are explained.</p>
<p>Grade Level(s):</p> <p>11-12</p>	
<p>Essential Question(s):</p> <ul style="list-style-type: none"> • What is Architectural Design? • What are the different Architectural forms? • How did different architectural styles develop? • What are some distinct characteristics of each style? • What are the fundamentals and principals of design and how are they used to in the field of architecture? • Why is the use of scale important? • What are the different types of Architectural drawings? • What are the advantages to using CAD software? 	<p>Enduring Understanding(s):</p> <ul style="list-style-type: none"> • Recognize the importance and scope of the world around us and distinguish the role Architects have had in your living situation. • Examine the application of different architectural forms. • Recognize historical architectural styles and identify several distinct characteristics of each style. • Relate how the development of materials and construction methods influenced architectural styles. • Relate design concepts and apply them to architecture. • Identify the six elements of design and the seven principles of design. • Measure and prepare drawings with different scales. • Differentiate between the types and purposes of architectural drawings. • Summarize the importance and function of using CAD software in Architecture.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the NJCCCS or Common Core Standards that are applicable

Learning Target	NJCCCS or CCS
<ol style="list-style-type: none"> 1. Formulate and list the numerous ways architectural design has impacted our way of life throughout history. 2. Evaluate the different architectural forms and create a model of each one determining their strengths and weaknesses. 3. Create a visual graphic representation of several styles and include key features of their design. 4. Assess the use of different materials and the surrounding environment related to the development of architectural styles. 5. Analyze an image of a house and compile a list of the different design aspects used in that structure. 6. List each element and principal of design and describe your preference for applying each to a residence of your own design. 7. List the scale you would use in drawing plans for different types of residences and different parts of that structure 8. Describe six types of architectural drawings in terms of the type of information that is communicated in each type. List the ones you would use for you own set of drawings. 9. Create a drawing by hand and then create a computer generated version of that listing the advantages and disadvantages of each technique. 	<ol style="list-style-type: none"> 1. TEC.9-12.8.2.12 B.4 TEC.9-12.8.2.12 B.6 2. TEC.9-12.8.2.12 B.1 TEC.9-12.8.1.12.F.2 LA.9-12.3.1.12.A.1 3. TEC.9-12.8.1.12 B.9 TEC.9-12.8.1.12.A.4 4. TEC.9-12.8.1.12 B.3 TEC.9-12.8.1.12 B.4 5. TEC.9-12.8.2.12 B.3 TEC.9-12.8.2.12 B.1 MA.9-12.4.2.12 A.2 6. TEC.9-12.8.1.12 B.10 TEC.9-12.8.1.12 B.11 7. TEC.9-12.8.2.12 B.4 8. TEC.9-12.8.2.12 B.6 MA.9-12.4.2.12 A.2 MA.9-12.4.2.12 A.1 9. TEC.9-12.8.2.12.B.3 MA.9-12.4.2.12 A.1 SCI.9-12.5.4.12 A.1

Inter-Disciplinary Connections:

- STEAM, Mathematics, Geometry, Engineering

Students will engage with the following textbook

Hepler, Donald E., Paul Ross. Wallach, and Dana J. Hepler. *Architecture: Drafting and Design*. New York, NY: Glencoe/McGraw-Hill, 1998. Print.

- Periodicals to include but not limited to newspapers, magazine articles, internet web pages

Students will write:

Use of Cornell Notes will be used to understand the procedures for completing drawings.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills.

Project based and self-exploration

Real life engineering problems

Examples of solution will be given first then students will problem solve and explore to create their own solutions to the problems.

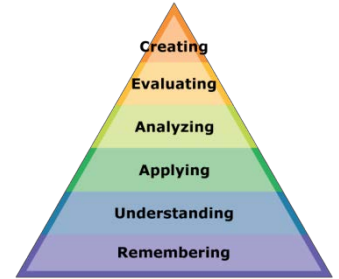
1. Students will research the history of architecture and present their findings to the class.
2. Students will create models of different architectural forms and test them to determine their strengths and weaknesses.
3. Students will create graphic posters that highlight a particular style and include information about the key features and why they picked the designs.
4. Students will choose an area of the world and show how the material affected the types of designs.
5. Students will look at a design of a house and label the different principals and elements of design and explain how each one is being used correctly or incorrectly.
6. Students will draw an ugly house that misuses principals and elements of design as well as forms and styles to reinforce the concepts of good design.
7. Students will use an architectural scale to measure a drawing and create it in AutoCAD in full scale.
8. Students will describe and construct the different types of drawings needed in a set of final plans.
9. Students will create sketches of floor plans and then create those drawings in AutoCAD and reflect on the advantages and disadvantages of each.

Students will need to have access to Autodesk AutoCAD and Revit. Drawing will come from the text and other architectural drawings produced by the teacher.

PART IV: EVIDENCE OF LEARNING

IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS.

IDENTIFY BLOOM'S LEVELS.



Formative Assessments:

WARM UP ACTIVITIES

Students will read the timeline, direction and constraint page for the current design journal page.
Students will check the daily entry log to ensure see where they left off and ensure it is up to date
Students will get safety glasses on and get their plans and materials ready.

CHECKPOINTS OF UNDERSTANDING

The design journals with be checked and graded after every component of learning.

Accommodations/Modifications:

Students have guided packets with questions that outline the research, and brainstorming.
The students will have an adjusted writing and mathematics packet to suit particular needs.
Students will receive extra one on one instruction to ensure safety and understanding.

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Summative Assessments:

Final evaluation of the project based on a rubric.
Final grade of design journal as it is re-graded in its entirety
Reflection paper about the entire project

Accommodations/Modifications:

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Allow students to get their work checked frequently as the assessments are build-ups.

Performance Assessments:

Construction of a solution to the challenge
Safely utilizing computer, shop tools, and machines

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Black Horse Pike Regional School District Curriculum Template

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PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<p>Course/Unit Title:</p> <p>Architectural Design</p> <p><i>Unit 2:</i> <i>Basic Area Design</i></p>	<p>Unit Summary:</p> <p>This unit covers the environmental and functional design factors needed to plan specific areas of a structure. This includes the design considerations necessary for effective solar orientation, efficient energy use, and ergonomic and ecological planning. Major considerations include the function, location, decor, size, and shape of the various areas including: kitchen, living spaces, bathroom, bedrooms, outdoor spaces and utility areas.</p>
<p>Grade Level(s):</p> <p>11-12</p>	
<p>Essential Question(s):</p> <ul style="list-style-type: none"> • How do we take advantage of the environment to lower energy costs and reduce pollution? • What is Ergonomics? • What is the function of indoor living spaces? • What can be included in outdoor living spaces? • Why is the design of traffic area important to the flow of a house plan? • What are some of the codes and regulations for different areas of the structure? • What is the work triangle and why is it crucial in the design of a kitchen? • What is included in general service or utility areas? • What are important factors to consider when designing a sleeping area? • What are the different types of bathrooms? 	<p>Enduring Understanding(s):</p> <ul style="list-style-type: none"> • Recognize how to orient a house on a lot to take the best advantage of solar energy and features of the lot. • Illustrate ways to design a structure ergonomically. • Identify the function of indoor living spaces. • Examine the different types of outdoor living spaces and how they differ by location and style. • Determine an effective traffic pattern in a home. • Interpret the guidelines for various design feature like hallways and stairs. • Determine the best size, shape, location of a kitchen in a house with special consideration of the guidelines of efficient design. • Recognize the kinds of equipment that is included in a utility room. • Identify the factors that need to be considered when designing a sleeping area. • Examine the location and different types of bathrooms in a house. • Contrast the design considerations of location, size, décor, and shape of all areas in a dwelling.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the NJCCCS or Common Core Standards that are applicable

Learning Target	NJCCCS or CCS
1. Demonstrate with a model why certain sides of a house receive the most light and heat. Compare and contrast winter and summer changes.	<p><i>TEC.9-12.8.2.12 B.4</i> <i>TEC.9-12.8.2.12 B.6</i> <i>TEC.9-12.8.2.12 B.3</i> <i>MA.9-12.4.2.12 A.1</i> <i>SCI.9-12.5.4.12 A.1</i></p>
2. Create a list of the ecological and ergonomical factors that need to be considered when designing your own residence.	<p>2. <i>TEC.9-12.8.2.12 B.1</i> <i>TEC.9-12.8.1.12.F.2</i> <i>LA.9-12.3.1.12.A.1</i></p>
3. Design an open space that includes various indoor living spaces by first listing the functions that you or a client need in a home.	<p>3. <i>TEC.9-12.8.1.12 B.9</i> <i>TEC.9-12.8.1.12.A.4</i></p>
4. Create your own plan for an outdoor living space using a northern and a southern location.	<p>4. <i>TEC.9-12.8.1.12 B.3</i> <i>TEC.9-12.8.1.12 B.4</i></p>
5. Sketch the floor plan of a home of your design. Plan the most efficient traffic pattern by tracing the route of your daily routine.	<p>5. <i>TEC.9-12.8.2.12 B.3</i> <i>TEC.9-12.8.2.12 B.1</i> <i>MA.9-12.4.2.12 A.2</i></p>
6. Examine the general codes for traffic areas and conclude why they are in place.	<p>6. <i>TEC.9-12.8.1.12 B.10</i> <i>TEC.9-12.8.1.12 B.11</i></p>
7. Construct kitchens using the six types of kitchen shapes and list at least one advantage and one disadvantage of each.	<p>7. <i>TEC.9-12.8.2.12 B.4</i></p>
8. Design a full double garage and driveway for the house of your design. Include storage, laundry facilities, and a work bench. Identify the type of doors and windows you would like to include.	<p>8. <i>TEC.9-12.8.2.12 B.6</i> <i>MA.9-12.4.2.12 A.2</i> <i>MA.9-12.4.2.12 A.1</i></p>
9. Plan three types of bedrooms for the following people: a six-year old, a teenager, and a master bedroom for a married couple.	<p>9. <i>TEC.9-12.8.1.12 B.11</i> <i>TEC.9-12.8.2.12.F.3</i></p>
10. Draw plan of a bath you think is poorly designed and then draw a plan for remodeling the bath to make it more functional.	<p>10. <i>TEC.9-12.8.2.12 B.4</i> <i>MA.9-12.4.2.12 A.1</i></p>
11. Sketch a floorplan that takes into account all the design considerations of location, size, décor, and shape of all areas in a dwelling.	<p>11. <i>TEC.9-12.8.2.12 B.4</i> <i>TEC.9-12.8.2.12.F.3</i> <i>TEC.9-12.8.2.12 B.3</i> <i>TEC.9-12.8.2.12.F.3</i> <i>MA.9-12.4.2.12 A.1</i></p>

Inter-Disciplinary Connections:

- STEAM, Mathematics, Geometry, Engineering

Students will engage with the following textbook

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- Periodicals to include but not limited to newspapers, magazine articles, internet web pages

Students will write:

Use of Cornell Notes will be used to understand the procedures for completing drawings.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills.

Project based and self-exploration

Real life engineering problems

Examples of solution will be given first then students will problem solve and explore to create their own solutions to the problems.

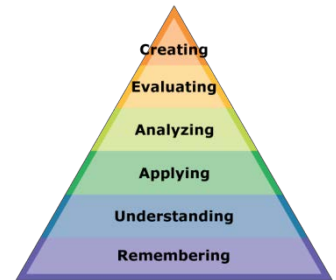
1. Students will create a model out of paper and using a light, show how the sun affects it at different times and different times of year.
2. Students will research and present a type of ecological problem that architects must overcome and then show a product or area that was designed ergonomically.
3. Students will Interview another person and ask them what they would like in an outdoor space and sketch up ideas for a site plan on a budget. They will return them to that person to generate feedback.
4. Students will take an existing house and design an two different outdoor spaces one in a cold and one in a warm climate in Autodesk Revit
5. Students will sketch the floor plan of their house and use it to create a computerized file in AutoCAD.
6. Students will research five different codes for traffic areas and explain why each one is in place.
7. Students will design the six types of kitchen shapes on paper and list at least one advantage and one disadvantage of each.
8. Students will complete a man or woman cave activity in Revit where they will remodel a broken down garage and include a bathroom, storage, laundry facilities, and a work bench. Also, include doors and windows and components.
9. Students will draw three types of bedrooms for different living situation and include the necessary furniture required in each room in AutoCAD.
10. Students will redesign a bathroom in AutoCAD to make it more functional.
11. Students will sketch a floor plan of a home of their choice.

Students will need to have access to Autodesk AutoCAD and Revit. Drawing will come from the text and other architectural drawings produced by the teacher.

PART IV: EVIDENCE OF LEARNING

IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS.

IDENTIFY BLOOM'S LEVELS.



Formative Assessments:

WARM UP ACTIVITIES

Students will read the timeline, direction and constraint page for the current design journal page.
Students will check the daily entry log to ensure see where they left off and ensure it is up to date
Students will get safety glasses on and get their plans and materials ready.

CHECKPOINTS OF UNDERSTANDING

The design journals with be checked and graded after every component learned.

Accommodations/Modifications:

Students have guided packets with questions that outline the research, and brainstorming.
The students will have an adjusted writing and mathematics packet to suit particular needs.
Students will receive extra one on one instruction to ensure safety and understanding.

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Summative Assessments:

Final evaluation of the project based on a rubric.
Final grade of design journal as it is re-graded in its entirety
Reflection paper about the entire project

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Performance Assessments:

Construction of a solution to the challenge
Safely utilizing computer, shop tools, and machines

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

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PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<p>Course/Unit Title:</p> <p>Architectural Design</p> <p><i>Unit 3:</i> <i>General Construction</i></p>	<p>Unit Summary:</p> <p>This unit begins with an overview of the basic scientific and modular principles upon which construction systems are based. Each major construction system will be explained as students are introduced to the specialized drawings needed to complete detailed descriptions of the structural design. Types of drawings included are those used to describe foundations and fireplaces and wood-frame, masonry, concrete, steel, and reinforced-concrete systems. This will also cover framing systems that explains and shows in detail how to design and draw the framing systems for the major construction components of a building: floors, walls, and roofs.</p>
<p>Grade Level(s):</p> <p>11-12</p>	
<p>Essential Question(s):</p> <ul style="list-style-type: none"> • What are the physical forces that act on a building? • What are the factors that determine the strength of a structural component? • What are the different types of foundations and when are they used? • What components are necessary for functional and safe fireplace? • What is the difference between skeleton stick framing and post and beam construction? • What are the major differences and uses of dimensional lumber, plywood and structural timber? • What are the types of masonry material used in structures? • What are the three types of steel construction and what is the purpose of each? 	<p>Enduring Understanding(s):</p> <ul style="list-style-type: none"> • Identify and describe the forces that act on a building. • Describe the factors that determine the strength of components and the situations where they are used. • Identify the components and material used in foundations and describe the different types used. • Explain what the parts of the fireplace are and how each plays a role in the safe and effective operation. • Recognize the difference and the uses of stick framing versus post and beam construction. • Describe the differences between dimensional lumber, plywood and structural timber. • Identify the four types of masonry walls and the types of materials used in their construction. • Compare the three types of steel construction and explain the basic purpose of each.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the NJCCCS or Common Core Standards that are applicable

<u>Learning Target</u>	<u>NJCCCS or CCS</u>
1. Describe and illustrate four structural forces and give an example of how each can be counteracted.	TEC.9-12.8.2.12 B.4 TEC.9-12.8.2.12 B.6 TEC.9-12.8.2.12 B.3
2. Explain what makes up a building load and choose the best roof and structural components for that building. Evaluate the best materials for the structure.	MA.9-12.4.2.12 A.1 SCI.9-12.5.4.12 A.1 TEC.9-12.8.2.12 B.1 TEC.9-12.8.1.12.F.2
3. Sketch the different types of foundations noting the advantage and disadvantage of each. List the materials used and label the different parts of the structural foundations.	LA.9-12.3.1.12.A.1 TEC.9-12.8.1.12 B.9 TEC.9-12.8.1.12.A.4 TEC.9-12.8.1.12 B.3
4. Design a fireplace for your house and show all the components of the design and describe the function of each part.	TEC.9-12.8.2.12 B.3 TEC.9-12.8.2.12 B.1 MA.9-12.4.2.12 A.2
5. Describe and illustrate the differences between skeleton-from and post-and-beam construction as well as the differences between platform and balloon framing.	TEC.9-12.8.1.12 B.10 TEC.9-12.8.2.12 B.4 TEC.9-12.8.2.12 B.6
6. List six types of fabricated member used in light construction.	MA.9-12.4.2.12 A.1 TEC.9-12.8.1.12 B.11
7. Select the lumber grade you will specify for the studs, rafters, sheathing, and joists for the house you are designing.	TEC.9-12.8.2.12.F.3 TEC.9-12.8.2.12 B.4 MA.9-12.4.2.12 A.1
8. Name three uses for softwood and three uses for hardwood in light construction.	TEC.9-12.8.2.12 B.4 TEC.9-12.8.2.12.F.3
9. Compare the types of masonry walls and describe the types of concrete construction systems.	TEC.9-12.8.2.12 B.3 TEC.9-12.8.2.12.F.3
10. Sketch the structural methods of preventing wind and earthquake damage.	MA.9-12.4.2.12 A.1

Inter-Disciplinary Connections:

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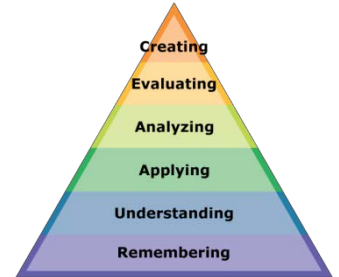
1. Students will demonstrate four structural forces that act on a building by modeling them from various items around the classroom.
2. Students will choose different roof styles for different buildings and list the best materials to use for each in Autodesk Revit.
3. Students will design four different foundations and create detail views of each and list the materials and the types of structures they are used in.
4. Students will label the important parts of a fire place and explain how each one relates to its safe and effective function.
5. Students will create a scale model of a small shed and illustrate the differences between skeleton-frame and post-and-beam construction as well as the differences between platform and balloon framing.
6. Students will identify six types of fabricated members used in light construction and give an application of each on used in a house.
7. Students will virtually shop for the lumber they would use to create their model shed with actual sized lumber by looking at home center websites.
8. Students will present the three uses of both softwood and hard wood in light construction.
9. Students will take a picture of a masonry wall and describe the type of system used and the application it was found.
10. Students will design methods to update a structure to prevent wind and/or earthquake damage.

Students will need to have access to Autodesk AutoCAD and Revit. Drawing will come from the text and other architectural drawings produced by the teacher.

PART IV: EVIDENCE OF LEARNING

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Formative Assessments:

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Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<p>Course/Unit Title:</p> <p>Architectural Design</p> <p><i>Unit 4:</i> <i>Working Architectural Drawings</i></p>	<p>Unit Summary:</p> <p>This unit includes the principles and procedures for preparing working drawings to describe the electrical, comfort-control (HVAC), and plumbing systems of a structure. Passive and active solar heating and cooling systems are also explained. It culminates by describing how architectural plans are checked and combined into sets and how drawings are interrelated to other drawings, details, and documents such as schedules, specifications, cost estimates, financial plans, codes, and contracts. A complete set of working drawings will be created. Lastly the unit will cover the major career opportunities in architecture and construction, including information on preparing for a career in these fields so students can find out what they are interested in.</p>
<p>Grade Level(s):</p> <p>11-12</p>	
<p>Essential Question(s):</p> <ul style="list-style-type: none"> • What information do you need and what is included in the design of a floor plan? • How do you draw a floor plan? • How do you apply the principals and elements of design when design elevations? • How do you accurately scale and draw a complete elevation from a floor plan? • What are the different types of section and detail views? • What are the major elements used in site design? • What are some basics of framing drawings? • Why are electrical and mechanical drawings important to the development of a house? • What are the final stages of creating an architectural plan? • What are possible careers in the field of Architecture and how do you prepare for them? 	<p>Enduring Understanding(s):</p> <ul style="list-style-type: none"> • Gather information needed to design an architectural project and understand how to create a floor plan sketch. • List the sequence of steps to draw a floor plan. • Recognize the principals and elements of design in creating an elevation drawing. • Recall the steps to project an elevation from a floorplan and complete an accurate elevation drawing. • Describe the types and components of sectional, detail, and cabinetry drawings. • Identify they major elements of site design and use them to create a survey and plot plan. • Describe the construction of a house through framing plans. • Recognize the symbols used in electrical and mechanical drawings and be able to interpret schematics of each system. • Organize and check a complete set of architectural drawings. • Name and describe the many career opportunities available in architecture and related fields.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the NJCCCS or Common Core Standards that are applicable

<u>Learning Target</u>	<u>NJCCCS or CCS</u>
<ol style="list-style-type: none"> Develop a floor plan for a family of four, including two small children and a person who uses a wheelchair. 	<p>TEC.9-12.8.2.12 B.4 TEC.9-12.8.2.12 B.6 TEC.9-12.8.2.12 B.3 MA.9-12.4.2.12 A.1 SCI.9-12.5.4.12 A.1</p>
<ol style="list-style-type: none"> Draw and dimension the floor plan of your own home. Create a sketch of an elevation of your own house. Move or change the doors and windows to improve the design. 	<p>2. TEC.9-12.8.2.12 B.1 TEC.9-12.8.1.12.F.2 LA.9-12.3.1.12.A.1</p>
<ol style="list-style-type: none"> Project the front, rear right, and left elevations of a floor plan of your own design. Add elevations symbols. Draw a full section view of a house you have designed. Include detail views as well. 	<p>3. TEC.9-12.8.1.12 B.9 TEC.9-12.8.1.12.A.4</p>
<ol style="list-style-type: none"> Evaluate and discuss the environment and human-related influences that affect site design. Include these when you draw a site plan of your own house. 	<p>4. TEC.9-12.8.1.12 B.3 TEC.9-12.8.1.12 B.4</p>
<ol style="list-style-type: none"> Prepare a stud layout for a home of your design and construct a scale model out of balsa wood. 	<p>5. TEC.9-12.8.2.12 B.3 TEC.9-12.8.2.12 B.1 MA.9-12.4.2.12 A.2</p>
<ol style="list-style-type: none"> Draw the complete electrical plan for the house you are designing. Show all circuits and label the capacity of each. Identify the circuits protected by a GCFI device. 	<p>6. TEC.9-12.8.1.12 B.10 TEC.9-12.8.1.12 B.11</p>
<ol style="list-style-type: none"> Check the set of house plans you have developed in earlier exercises for the types of information included you listed previously and prepare at least one change order. 	<p>7. TEC.9-12.8.2.12 B.4</p> <p>8. TEC.9-12.8.2.12 B.6 MA.9-12.4.2.12 A.2 MA.9-12.4.2.12 A.1</p>
<ol style="list-style-type: none"> Interview a person in a career related to architecture. Find out why the person chose the career, the education or training required, and the facts about the work the person does. Prepare a list of at least five questions you might ask the person before the interview. 	<p>9. TEC.9-12.8.1.12 B.11 TEC.9-12.8.2.12.F.3</p> <p>10. TEC.9-12.8.2.12 B.4 MA.9-12.4.2.12 A.1</p>

Inter-Disciplinary Connections:

- STEAM, Mathematics, Geometry, Engineering

Students will engage with the following textbook

Hepler, Donald E., Paul Ross. Wallach, and Dana J. Hepler. *Architecture: Drafting and Design*. New York, NY: Glencoe/McGraw-Hill, 1998. Print.

- Periodicals to include but not limited to newspapers, magazine articles, internet web pages

Students will write:

Use of Cornell Notes will be used to understand the procedures for completing drawings.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills.

Project based and self-exploration

Real life engineering problems

Examples of solution will be given first then students will problem solve and explore to create their own solutions to the problems.

1. Students will sketch a floor plan for the given situation that meets the needs of the family.
2. Students will draw their own house floor plan in AutoCAD.
3. Students will take a picture of their house and sketch an elevation on paper. They will then use that sketch to create a drawing in AutoCAD.
4. Students will design an elevation projected from their floor plan they created from their own design earlier in the unit.
5. Students will draw a full section view of their house in AutoCAD
6. Students will be given environmental factor to consider that they must design around when creating their own site plan.
7. Students will create a scaled model of their house designed from the floor plans and elevations made from balsa wood to show the structural framing of the dwelling.
8. Students will create an electrical plan for the house you are designing. Show all circuits and label the capacity of each. Identify the circuits protected by a GCFI device.
9. Students will check someone else's final plans and act as an architect that signs off on the plans for ready for construction. List and prepare at least one change order.
10. Students will interview a person in a career related to architecture. Find out why the person chose the career, the education or training required, and the facts about the work the person does. Prepare a list of at least five questions you might ask the person before the interview.

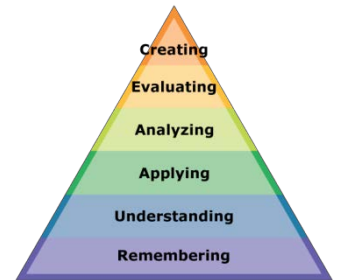
Students will need to have access to Autodesk AutoCAD and Revit. Drawing will come from the text and other architectural drawings produced by the teacher.

PART IV: EVIDENCE OF LEARNING

IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS.

IDENTIFY BLOOM'S LEVELS.

Formative Assessments:



WARM UP ACTIVITIES

Students will read the timeline, direction and constraint page for the current design journal page.
Students will check the daily entry log to ensure see where they left off and ensure it is up to date
Students will get safety glasses on and get their plans and materials ready.

CHECKPOINTS OF UNDERSTANDING

The design journals with be checked and graded after every component learned.

Accommodations/Modifications:

Students have guided packets with questions that outline the research, and brainstorming.
The students will have an adjusted writing and mathematics packet to suit particular needs.
Students will receive extra one on one instruction to ensure safety and understanding.

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Summative Assessments:

Final evaluation of the project based on a rubric.
Final grade of design journal as it is re-graded in its entirety
Reflection paper about the entire project

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.

Performance Assessments:

Construction of a solution to the challenge
Safely utilizing computer, shop tools, and machines

Accommodations/Modifications:

Alternative assignments, additional time for assignments, preferential seating arrangements one on one interaction, after school help, and assistance for organization. Check frequently for student understanding.

Allow students to get their work checked frequently as the assessments are build-ups.