

**Randolph Township Schools
Randolph High School**

**Advanced Woodworking
Curriculum**

**Department of
Science, Technology, Engineering, and Math**
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Randolph Township Schools
Department of Science, Technology, Engineering, and Math

Advanced Woodworking

Table of Contents

<u>Section</u>	<u>Page(s)</u>
Mission Statement and Education Goals – District	3
Affirmative Action Compliance Statement	3
Educational Goals – District	4
Introduction	5
Curriculum Pacing Chart	6
Unit plans	7-20
APPENDIX A – D	21

Randolph Township Schools

Mission Statement

We commit to inspiring and empowering all students in Randolph Schools to reach their full potential as unique, responsible and educated members of a global society.

Randolph Township Schools Affirmative Action Statement

Equality and Equity in Curriculum

The Randolph Township School district ensures that the district's curriculum and instruction are aligned to the state's standards. The curriculum addresses the elimination of discrimination and the achievement gap, as identified by underperforming school-level AYP reports for state assessments. The curriculum provides equity in instruction, educational programs and provides all students the opportunity to interact positively with others regardless of race, creed, color, national origin, ancestry, age, marital status, affectional or sexual orientation, gender, religion, disability or socioeconomic status.

N.J.A.C. 6A:7-1.7(b): Section 504, Rehabilitation Act of 1973; N.J.S.A. 10:5; Title IX, Education Amendments of 1972

RANDOLPH TOWNSHIP BOARD OF EDUCATION EDUCATIONAL GOALS VALUES IN EDUCATION

The statements represent the beliefs and values regarding our educational system. Education is the key to self-actualization, which is realized through achievement and self-respect. We believe our entire system must not only represent these values, but also demonstrate them in all that we do as a school system.

We believe:

- The needs of the child come first
- Mutual respect and trust are the cornerstones of a learning community
- The learning community consists of students, educators, parents, administrators, educational support personnel, the community and Board of Education members
- A successful learning community communicates honestly and openly in a non-threatening environment
- Members of our learning community have different needs at different times. There is openness to the challenge of meeting those needs in professional and supportive ways
- Assessment of professionals (i.e., educators, administrators and educational support personnel) is a dynamic process that requires review and revision based on evolving research, practices and experiences
- Development of desired capabilities comes in stages and is achieved through hard work, reflection and ongoing growth

Randolph Township Schools

Department of Science, Technology, Engineering, and Math

Introduction

Randolph Township Schools is committed to excellence. We believe that all children are entitled to an education that will equip them to become productive citizens of the 21st century. We believe that an education grounded in the fundamental principles of science, technology, engineering, and math (STEM) will provide students with the skills and content necessary to become future leaders and lifelong learners.

A sound STEM education is grounded in the principles of inquiry, rigor, and relevance. Students will be actively engaged in learning as they use real-world STEM skills to construct knowledge. They will have ample opportunities to manipulate materials and solve problems in ways that are developmentally appropriate to their age. They will work in an environment that encourages them to take risks, think critically, build models, observe patterns, and recognize anomalies in those patterns. Students will be encouraged to ask questions, not just the “how” and the “what” of observed phenomena, but also the “why”. They will develop the ability, confidence, and motivation to succeed academically and personally.

STEM literacy requires understandings and habits of mind that enable students to make sense of how our world works. As described in Project 2061’s *Benchmarks in Science Literacy*, *The Standards for Technological Literacy*, and *Professional Standards for Teaching Mathematics*, literacy in these subject areas enables people to think critically and independently. Scientifically and technologically literate citizens deal sensibly with problems that involve mathematics, evidence, patterns, logical arguments, uncertainty, and problem-solving.

Advanced Woodworking

Introduction

This is a semester elective course designed for interested high school student who have successfully completed Basic Woodworking. Throughout the course students will concentrate on the more sophisticated aspects of project and materials planning, appropriate operation of hand and machine tools to execute plans, and proper finishing procedures to ensure durability. Technology and literacy are infused throughout the course, with connections made to a variety of subjects including physical science and geometry.

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Curriculum Pacing Chart
Advanced Woodworking

SUGGESTED TIME ALLOTMENT	UNIT NUMBER	CONTENT - UNIT OF STUDY
1 week and ongoing	I	Safety
1 week and ongoing	II	Planning
6 weeks	III	Constructing a complex wooden artifact comprised of several components
1 week and ongoing	IV	Finishing
6 weeks	V	Mass production
3 weeks	VI	Independent project

RANDOLPH TOWNSHIP SCHOOL DISTRICT

Advanced Woodworking

UNIT I: Safety

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS	
Following proper safety measures will ensure a healthy working environment	<ul style="list-style-type: none"> In what ways has “personal safety” changed in the workplace? 	
Maintaining the workspace in a neat, safe condition helps to protect the user from injury and enhances the quality of the finished product.	<ul style="list-style-type: none"> How can someone demonstrate responsibility? 	
KNOWLEDGE	SKILLS	NJCCCS
<p>Students will know:</p> <p>When using hand tools: maintain them in sharp, usable condition cut away from oneself hold the tool in both hands employ clamping devices where feasible wear safety glasses</p> <p>When using power tools: wear safety glasses keep all body parts a safe distance from moving parts keep hair and clothing out of the way work carefully and without distraction</p> <p>Correct safety procedures to follow when using soldering irons and electric power supplies include wearing safety glasses, having all equipment ready, and clearing work area of unneeded materials.</p>	<p>Students will be able to:</p> <p>Demonstrate safe practices by wearing safety glasses at all appropriate times. Use hand found in the lab safely and responsibly.</p> <p>Demonstrate safe practices by wearing safety glasses at all appropriate times. Practice safe procedures when working with electricity. Use power tools found in the lab safely and responsibly.</p> <p>Operate soldering equipment and electrical power supplies in a safe, energy-conserving manner.</p>	<p><u>Science:</u> 5.1.8.C1-.2 5.1.12.C.1</p>

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Curriculum Pacing Chart
Advanced Woodworking

SUGGESTED TIME ALLOTMENT	CONTENT-UNIT OF STUDY	SUPPLEMENTAL UNIT RESOURCES
Safety-1 Week and Ongoing		
	Wearing Safety Glasses	<p style="text-align: center;"><u>Resources:</u></p> <p>Teacher generated handouts, Power Point slides, demonstrations</p> <p style="text-align: center;"><u>SUGGESTED ACTIVITIES:</u></p> <p>Ongoing observation of safe, responsible procedures at all times in the lab</p>
	Safe use of Hand Tools	
	Safe Use of Power Tools	
	Safe Procedures for Soldering Equipment and Electrical Power Supplies	

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Advanced Woodworking
UNIT II: Planning

ENDURING UNDERSTANDINGS		ESSENTIAL QUESTIONS	
Careful, accurate plans, such as drawings, are essential to achieving a successful result.		<ul style="list-style-type: none"> What is the purpose of creating? 	
The more complete and accurate a plan is, the better the chance for success. An essential part of planning is the responsible use of materials. It is essential to plan your work in such a way as to conserve vital, often irreplaceable resources.		<ul style="list-style-type: none"> How do ideas become reality? 	
KNOWLEDGE	SKILLS	CCSS	
<p>Students will know:</p> <p>3-D objects can be represented accurately on a 2-D plane.</p> <p>Tools are used to accurately represent straight lines, square corners, and regular curves.</p> <p>Computers can be used to more quickly and accurately portray an object than by hand techniques.</p> <p>There are many sources available to access plans created by other people, especially the Internet.</p>	<p>Students will be able to:</p> <p>Draw a sketch of an original design using graph paper, straight edge, ruler, and compass.</p> <p>Refine an original design using drafting instruments, <i>i.e.</i> drawing board, t-square, triangles, and compass.</p> <p>Use computer software (e.g., <i>sketch up</i>, Imagej) to create a 3-D representation of an original design to be used as part of a project.</p> <p>Analyze a working drawing from another source.</p> <p>Use digital resources to develop plans for projects, as well as to enhance existing plans and designs.</p>	<p><u>NJCCC Science:</u> 5.1.12.CO.1 5.3.12.A 5.3.12.B.1 5.4.12.C.1</p> <p><u>NJCCC Technology:</u> 8.2.12.B.1-3 8.2.12.B.5</p> <p><u>Common Core Math:</u> HSG-CO.A.1 HSG-CO.A.5 HSG-CO.D.12 HSG-MG.A.3</p> <p><u>Common Core ELA:</u> RST4 WHST7</p>	

<p>A bill of materials contains names, materials, and dimensions for each component of a made object, as well as a projected cost.</p> <p>When creating plans, consideration must be given to strategies for achieving the objectives safely, efficiently, and with regard to conserving valuable resources.</p>	<p>Create a spreadsheet to detail the individual components of a project, total amount of materials, and projected cost.</p> <p>Lay out a project in such a way as to conserve material, power, and cost.</p>	
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RANDOLPH TOWNSHIP SCHOOL DISTRICT
Unit II - Curriculum Pacing Chart
Advanced Woodworking

SUGGESTED TIME ALLOTMENT	CONTENT – UNIT OF STUDY	SUPPLEMENTAL UNIT RESOURCES
1 week and ongoing	Unit II –Planning Making a Sketch on Graph Paper Using Drafting Instruments Multiview Drawing Compiling a Bill of Materials Design with Sketch-Up Design with ImageJ	<p style="text-align: center;"><u>Resources:</u></p> <p style="text-align: center;">Teacher generated handouts, Power Point slides, demonstrations</p> <p style="text-align: center;"><u>SUGGESTED ACTIVITIES:</u></p> <p style="text-align: center;">Tavern Sign Mass Production Toy Self- designed project Small Model Aircraft</p>

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Advanced Woodworking
UNIT III: Constructing a complex wooden artifact
comprised of several components

ENDURING UNDERSTANDINGS		ESSENTIAL QUESTIONS
A complex artifact comprised of several elements is greater than the sum of its parts.		<ul style="list-style-type: none"> How do woodworkers design and create useful, pleasing objects?
Most substantial wooden objects such as pieces of furniture are assembled from a number of components and involve an array of skills and processes.		<ul style="list-style-type: none"> In what ways can diverse materials and processes be combined into a single product?
KNOWLEDGE	SKILLS	CCSS
<p>Students will know:</p> <p>The procedure for making full sized drawings and patterns. The procedure for developing a bill of materials.</p> <p>A variety of sophisticated woodworking techniques such as: Split turnings Duplicating parts Relief carving Incising letters with a router Fastening components with a Kreg system</p> <p>How to fit parts together into a whole.</p>	<p>Students will be able to:</p> <p>Draft a design and calculate a bill of materials for a complex project.</p> <p>Design and lay out a relief carving. Lay out and letter a legend or phrase on a sign board. Fabricate a split turning. Produce decorative trim by accurately cutting patterns with a band saw. Fasten components with a Kreg system.</p> <p>Create a woodworking project with components made using various tools, materials, and processes.</p>	<p><u>NJCCC Science:</u> 5.1.12.C.1 5.3.12.A 5.3.12.B.1 5.4.12.C.1</p> <p><u>NJCCC Technology:</u> 8.2.12.B.1-3 8.2.12.B.5</p> <p><u>Common Core Math:</u> HSG-CO.A.1 HSG-CO.A.5 HSG-CO.D.12 HSG-MG.A.3</p> <p><u>Common Core ELA:</u> RST4 WHST7</p>

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Unit III - Curriculum Pacing Chart
Advanced Woodworking

SUGGESTED TIME ALLOTMENT	CONTENT – UNIT OF STUDY	SUPPLEMENTAL UNIT RESOURCES
6 weeks	Unit III – Constructing a complex wooden artifact comprised of several components Planning and layout Split turnings Duplicating parts Relief carving Incising letters with a router Gluing and clamping Fastening using the Kreg system	<p style="text-align: center;"><u>Resources:</u></p> <p style="text-align: center;">Teacher generated handouts, Power Point slides, demonstrations</p> <p style="text-align: center;"><u>SUGGESTED ACTIVITIES:</u> Tavern Sign</p>

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Advanced Woodworking
UNIT IV: Finishing

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS	
Wood is an organic material, and thus needs to be preserved and protected.	<ul style="list-style-type: none"> How do the tactile qualities of a made object enhance the experience of the user? 	
People derive considerable enjoyment from the feel, warm colors, and interesting grain patterns in wooden artifacts.	<ul style="list-style-type: none"> How do the visual qualities of tone, hue, and grain pattern enhance the experience of the user? 	
KNOWLEDGE	SKILLS	NJCCCS
<p>Students will know:</p> <p>The color and tone of wood can be altered or improved by using stain and paint.</p> <p>Varnish and wax are used to preserve wooden surfaces, as well as to provide a smoother feel.</p>	<p>Students will be able to:</p> <p>Enhance the color and tone of a project by applying stain to a properly prepared wood surface.</p> <p>Employ spray paint to create an attractive color scheme on a properly prepared wood surface.</p> <p>Improve the tactile quality and protect a completed project by applying varnish to a properly stained wood surface.</p> <p>Apply wax to a properly varnished wood surface.</p>	<p><u>NJCCC</u> <u>Science:</u> 5.3.12.A 5.3.12.B.1 5.4.12.C.1</p> <p><u>Common Core</u> <u>Math:</u> HSG-CO.A.1 HSG-CO.A.5 HSG-CO.D.12 HSG-MG.A.3</p> <p><u>Common Core</u> <u>ELA:</u> RST4 WHST7</p>

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Unit IV - Curriculum Pacing Chart
Advanced Woodworking

SUGGESTED TIME ALLOTMENT	CONTENT – UNIT OF STUDY	SUPPLEMENTAL UNIT RESOURCES
1 week and ongoing	Unit IV –Finishing Staining Painting Spray Painting Wax French Polish	<p style="text-align: center;"><u>Resources:</u></p> <p style="text-align: center;">Teacher generated handouts, Power Point slides, demonstrations</p> <p style="text-align: center;"><u>SUGGESTED ACTIVITIES:</u> To be determined by student</p>

RANDOLPH TOWNSHIP SCHOOL DISTRICT

Advanced Woodworking

UNIT V: Mass production

ENDURING UNDERSTANDINGS		ESSENTIAL QUESTIONS
There are specialized techniques to make duplicate, interchangeable parts quickly, accurately, and dependably.		<ul style="list-style-type: none"> Do terms like “mass produced” and “factory made” necessarily imply poor quality?
Teamwork is vital to the completion of mass produced objects. Most of the objects we use on a daily basis have been mass-produced.		<ul style="list-style-type: none"> To what extent does mass production process affect results?
KNOWLEDGE	SKILLS	CCSS
<p>Students will know:</p> <p>A flow chart is a list of necessary steps in the construction of a mass produced object.</p> <p>Jigs and fixtures are used to produce parts.</p> <p>Hand and power tools are used to fabricate and assemble wood pieces.</p> <p>Spray paint, stain and varnish are used to finish objects.</p>	<p>Students will be able to:</p> <p>Create a flow chart delineating the procedure for fabricating and assembling the parts of a mass produced item.</p> <p>Set up and use jigs and fixtures to produce accurately made interchangeable parts.</p> <p>Produce at least twenty mass produced objects with an accuracy of +/- 1/16 “ on any dimension.</p> <p>Apply a consistently fine finish of paint, stain, or varnish to a series of mass produced objects.</p>	<p><u>NJCCC Science:</u> 5.1.12.C.1 5.3.12.A 5.3.12.B.1 5.4.12.C.1</p> <p><u>NJCCC Technology:</u> 8.2.12.B.1-3 8.2.12.B.5</p> <p><u>Common Core Math:</u> HSG-CO.A.1 HSG-CO.A.5 HSG-CO.D.12 HSG-MG.A.3</p> <p><u>Common Core ELA:</u> RST4 WHST7</p>

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Unit V - Curriculum Pacing Chart
Advanced Woodworking

SUGGESTED TIME ALLOTMENT	CONTENT – UNIT OF STUDY	SUPPLEMENTAL UNIT RESOURCES
6 weeks	Unit V: Mass production	<p style="text-align: center;"><u>Resources:</u></p> <p style="text-align: center;">Teacher generated handouts, Power Point slides, demonstrations</p> <p style="text-align: center;"><u>SUGGESTED ACTIVITIES:</u></p> <p style="text-align: center;">Mass production project, <i>eg</i> toy airplane</p>

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Advanced Woodworking
UNIT VI: Independent Project

ENDURING UNDERSTANDINGS		ESSENTIAL QUESTIONS
There are tools, materials, and processes, which can extend and improve our ability to accomplish goals.		<ul style="list-style-type: none"> How does one choose the correct tools, materials and processes to achieve a given goal?
All real world design solutions are created in a context of parameters and special considerations. Most of these contain a human element.		<ul style="list-style-type: none"> How do we choose what we really need, and how to go about getting it?
KNOWLEDGE	SKILLS	CCSS
<p>Students will know:</p> <p>Through use of the knowledge acquired in class an independent project can be designed and constructed.</p>	<p>Students will be able to:</p> <p>Draw a sketch of an original design using graph paper, straight edge, ruler, and compass.</p> <p>Refine an original design using drafting instruments; <i>i.e.</i> drawing board, t-square, triangles, and compass.</p> <p>Use computer software such as <i>sketch up</i> or Imagej to create a 3-D representation of an original design to be used as part of a project.</p> <p>Analyze a working drawing from another source.</p> <p>Use digital resources to develop plans for optional projects, as well as enhancing existing plans and designs.</p> <p>Create a spreadsheet to detail the individual components of a project, total amount of materials, and projected cost.</p> <p>Lay out a project in such a way as to conserve material, power, and cost.</p> <p>Demonstrate mastery of various hand tools to achieve a</p>	<p><u>NJCCC Science:</u> 5.1.12.C.1 5.3.12.A 5.3.12.B.1 5.4.12.C.1</p> <p><u>NJCCC Technology:</u> 8.2.12.B.1-3 8.2.12.B.5</p> <p><u>Common Core Math:</u> HSG-CO.A.1 HSG-CO.A.5 HSG-CO.D.12 HSG-MG.A.3</p> <p><u>Common Core ELA:</u> RST4 WHST7</p>

	<p>workmanlike result in the construction of a self-designed project</p> <p>Demonstrate mastery of various power tools to achieve a workmanlike result in the construction of a self-designed project</p> <p>Apply a consistently fine finish to a series of mass produced objects.</p>	
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RANDOLPH TOWNSHIP SCHOOL DISTRICT
Unit VI - Curriculum Pacing Chart
Advanced Woodworking

SUGGESTED TIME ALLOTMENT	CONTENT – UNIT OF STUDY	SUPPLEMENTAL UNIT RESOURCES
3 weeks	Unit VI – Independent Project	<p style="text-align: center;"><u>Resources:</u></p> <p style="text-align: center;">Electronic and print media</p> <p style="text-align: center;"><u>SUGGESTED ACTIVITIES:</u></p> <p style="text-align: center;">Student- designed project</p>

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Advanced Woodworking

APPENDIX A

SOFTWARE NAMES:

Google Sketch-Up
ImageJ

APPENDIX B

ASSESSMENT:

LIST OF ASSEMENT/TYPE

Assigned Projects
Optional Projects
Portfolio: Plans, Bills of Materials
Daily Formative Assessments
Performance Assessments

SUGGESTED RUBRICS TBD

APPENDIX C

SAMPLE INTERDISCIPLINARY UNITS

All topics of study will explore the connections between various disciplines within STEM education. Students will be required to read and analyze articles thereby including a literacy component. In addition, students will be using technology in the course to construct and share their work.

APPENDIX D

PLACEMENT CRITERIA

Any high school student who has an interest in the course and has successfully completed basic woods may enroll.