New Paltz Central School District
Technology
Grade 7

Time	Essential Questions/Content	Standards/Skills	Assessments
September - October	**<u>Unit 1: Design and Modeling</u>** • What is engineering? • What is technology? • What is the purpose of a portfolio for a student? For an engineer? • Why is it important for engineers to document their work in their engineering notebook? • How are our lives impacted by engineers? • What is the difference between an invention and an innovation? • How does the use of technology affect the way you live? ---------- • Introduction to engineering • Engineering careers • Engineers notebooks	• Define engineering and its impact • Define technology and its impact • Organize an engineer's notebook • Identify engineering careers	• Engineers notebook • Engineering Careers project
October - November	**<u>Unit 2: The Design Process</u>** • What is the design process and how is it used? • Why is brainstorming important when modifying or improving a product? • Why do people work in teams when solving design problems? • What is meant by constraints and criteria? • What is a design brief? When and why is it used? • What is a decision matrix? When and why is it used? • Why are design elements considered when engineers and designers invent or innovate a product? ---------- • Design process overview • Design elements	• Understand the design process • Understand design elements and their significance	• Furniture design brief • Notebook check

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November	**<u>Unit 3: Measurement</u>** • Should the United States convert to all metric measuring or continue to use both systems? • Why don't we use such measurement forms as the hand span, cubit, and pace very often? • Why are precision measuring tools not always accurate? ---------- • Standard and metric measurement • Precision measurement	• Understand standard and metric systems of measurement • Measure accurately to 16ths of an inch	• Measurement activity worksheets • Measurement lab (Air Racer)
November - December	**<u>Unit 4: Sketching and Dimensioning</u>** • What are pictorial drawings and how are they used by engineers? • What is an orthographic drawing and how is it used by engineers? • Why is it important to follow the "rules" of sketching and dimensioning? ---------- • Sketching techniques • Language of sketching • Orthographic projection • Dimensioning	• Demonstrate sketching techniques • Understand the importance of accurate sketching • Understand dimension	• Language of sketching activity • Orthographic Projection activity • Dimensioning activity • Notebook check

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January - February	**<u>Unit 5: Design for Production</u>** • Why would engineers use three-dimensional (3D) modeling when solving technological problems? • How do assembly constraints differ from geometric and numeric constraints? • What is the difference between a hand-drawn sketch, a working drawing, and a 3D model? • What is the difference between a part file (.ipt), an assembly file (.iam), and a working drawing (.idw)? • What is the difference between a model, a mockup, and a prototype? • What purpose do annotations serve in an assembly drawing? • Why is it important to follow the design process when creating a solution to a problem? • Why are teams of people used to solve problems? --- • Descriptive geometry • Coordinate systems • Computer modeling fundamentals • Inventor software	• Understand descriptive geometry and the coordinate plane. • Use Inventor • Understand IPT - basic parts files • Understand IAM - the constraint system and assemblies • Produce assembling drawings • Understand the purpose of IDW - working drawings and annotation of drawings	• Block sketch activity • Intro to Inventor quiz • Title block • Sketch plane cube • Reverse engineer • Peg board toy parts • Peg board toy assembly • Peg board toy IDW • Playground design brief • Playground design IPT, IAM, IDW • Engineer's notebook

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March - April	**Unit 6: Science of Technology I** • What is the purpose of using a simple or compound machine? • What is the difference between a simple and a compound machine? • If energy cannot be created or destroyed, why do we need to be concerned about our energy sources? • What is the relationship between potential energy and kinetic energy? • How do subsystems interact to create a system? • Why is the design process used when creating new products? ---------- • Simple machines • Compound machines • Energy conservation • Kinetic vs. potential energy	• Understand the six simple machines and how they are used • Understand how simple machines make complex devices • Understand kinetic vs. potential energy	• Simple machines handout • Simple machines scavenger hunt • Simple machines exploration (group work) • Energy lab
April - May	**Unit 7: Science of Technology II** • ---------- -- • Design process review • Roller Coaster Mania project • Systems and subsystems • Rube Goldberg • Power tools • Hand tools	• Understand the design process • Understand systems and subsystems • Use power and hand tools safely	• Systems worksheet • Roller Coaster project/rubric • Rube Goldberg device/rubric • Safety test • Machine and hand tool test • Notebook check

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May - June	**<u>Unit 8: Dragster Fabrication</u>** • What are templates? • What is drag? How does the car's shape and texture effect drag? • How does drag affect a car's speed? --- • Templates • Drag • Drag Effects • Constraints	Literacy • Assess how point of view or purpose shapes the content and style of the text. • Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words. • Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. • Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others. • Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism. Math • Apply properties of operations as strategies to add, subtract, factor, and explain linear expressions with rational coefficients. • Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. • Describe the two dimensional figures that result from slicing three dimensional figures, as in plane sections.	• Car fabrication • Finishing • Scale and constraints • Performance and drag coefficient