Building: RCHS **Course:** Tech Ed 7/8 **Grade:** **Tier:** 4 **Approved:** E (Morawiec) C (Troxel) A (Lemke / Perkins)

PLC Question #1: What do we want all students to know and be able to do?

Unit 1: Safety ✅		Unit 2: Engineering Design Process (EDP) ✅		Unit 3: Measurement ✅	
Priority Standard(s) • **TE.AC.2:** Students will be able to select and use architecture and construction technologies.		**Priority Standard(s)** • **TE.ENG.2**: Students will understand and apply the engineering design process to solve problems.		**Priority Standard(s)** • **TE.AC.2:** Students will be able to select and use architecture and construction technologies.	
Supporting Standard(s) • N/A		**Supporting Standard(s)** • N/A		**Supporting Standard(s)** • N/A	
Learning Outcomes		**Learning Outcomes**		**Learning Outcomes**	
Students need to know (concrete knowledge) • Ex. vocabulary, facts, concepts, etc.	**DOK Level**	**Students need to know (concrete knowledge)** • Ex. vocabulary, facts, concepts, etc.	**DOK Level**	**Students need to know (concrete knowledge)** • Ex. vocabulary, facts, concepts, etc.	**DOK Level**
• **TE.AC.2.A**: Demonstrate the safe and appropriate use of all tools common to the construction industry.		• **TE.ENG.2.A**: Explain reasons for using an engineering design process.		• **TE.AC.2.C**: Apply measurement systems in the planning and layout process used in the construction industry.	
Students will understand (abstract ideas) • Ex. connections, relationships, frameworks, etc.	**DOK Level**	**Students will understand (abstract ideas)** • Ex. connections, relationships, frameworks, etc.	**DOK Level**	**Students will understand (abstract ideas)** • Ex. connections, relationships, frameworks, etc.	**DOK Level**
• **TE.AC.2.A.b.1**: Identify and explain the use of simple hand tools such as hammers, screwdrivers, handsaws, etc.		• TE.ENG.2.A.b.1: Explain that the design process is a purposeful method of planning practical solutions to problems.		• **TE.AC.2.C.b.3**: Communicate ideas and plans through sketching or drawing. • **TE.AC.2.C.b.4**: Demonstrate use of the standard measuring system to the 1/4” and the metric measuring system to millimeters.	
Students will do (active application)	**DOK Level**	**Students will do (active application)**	**DOK Level**	**Students will do (active application)**	**DOK Level**
Identifying Common Hand Tools • I can identify common hand tools such as hammers, screwdrivers, handsaws, pliers, and wrenches. • I can explain the function and purpose of different hand tools used in construction and repair. • I can compare different types of tools within a category, such as Phillips vs. flathead screwdrivers. **Safely Handling and Maintaining Hand Tools** • I can demonstrate the proper handling and use of hand tools safely and effectively. • I can describe how to maintain hand tools by cleaning, storing, and inspecting them for		**Understanding the Engineering Design Process** • I can describe the engineering design process as a step-by-step approach to solving problems. • I can explain why the engineering design process is iterative, meaning steps may need to be repeated. **Analyzing and Refining Designs** • I can analyze failures in a design to identify what needs improvement. • I can modify and refine a design based on test results and feedback. **Testing and Selecting Solutions** • I can test different solutions to determine which		**Understanding Measurement Systems** • I can explain the importance of measurement in construction planning and layout. • I can identify different measurement systems, including standard (imperial) and metric units. **Using Measurement Tools** • I can correctly use a ruler, tape measure, and other measuring tools. • I can demonstrate how to read and interpret measurements to the nearest fraction or millimeter. **Applying Measurement in Construction** • I can apply accurate measurements when	

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damage. • I can follow safety guidelines when using hand tools to prevent injury. **Applying Hand Tool Skills** • I can use hand tools to complete basic tasks, such as cutting, fastening, and assembling materials.	one best meets the design requirements. • I can document the changes made to a design as part of the iterative process. **Applying Engineering Design in Real-World Contexts** • I can apply the engineering design process to solve real-world problems.	planning and laying out a construction project. • I can calculate dimensions and proportions to ensure a precise layout. **Converting and Calculating Measurements** • I can convert between standard and metric measurement systems. • I can add, subtract, multiply, and divide measurements to determine material needs.
Domain-specific Vocabulary	**Domain-specific Vocabulary**	**Domain-specific Vocabulary**
• Personal Protective Equipment (PPE) • Hazard • Safety regulations • Risk assessment • Emergency procedures • Workplace safety • Safety protocol • Accident prevention • Ergonomics • Occupational health • First aid • Safety signs • Hazardous materials • Workplace inspections • Incident report • Safety training	• Brainstorm • Design specifications • Detailed sketches • Technical drawings • Prototype • Performance • Functionality • Test data • Iterate • Design • Research • Constraints • Modifications • Final design • Efficiency • Sustainability • Cost-effectiveness • Engineering design process	Imperial system Metric system Measurements Layout Scale Tolerances Dimensions Tape measure Ruler Calipers Level Imperial units Metric units Scaled drawing Layout plan Precision Project specifications Standards Mistakes

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PLC Question #1: What do we want all students to know and be able to do?

Module 1: Aerodynamics & Design ✅		Module 2: Load & Structural Integrity ✅		Module 3: Electricity & Circuits ✅	
Priority Standard(s) • **TE.ENG.5** Students will gain knowledge and applications of various engineering disciplines.		**Priority Standard(s)** • **TE.ENG.5** Students will gain knowledge and applications of various engineering disciplines.		**Priority Standard(s)** • **TE.EEC.11:** Students will explain the operation of steady state circuits in electrical, electronic, and control devices.	
Supporting Standard(s) • N/A		**Supporting Standard(s)** • N/A		**Supporting Standard(s)** • N/A	
Learning Outcomes		**Learning Outcomes**		**Learning Outcomes**	
Students need to know (concrete knowledge) • Ex. vocabulary, facts, concepts, etc.	**DOK Level**	**Students need to know (concrete knowledge)** • Ex. vocabulary, facts, concepts, etc.	**DOK Level**	**Students need to know (concrete knowledge)** • Ex. vocabulary, facts, concepts, etc.	**DOK Level**
• **TE.ENG.5.D**: Apply aerospace engineering knowledge and skills.		• **TE.ENG.5.A**: Apply civil and environmental engineering knowledge and skills.		• **TE.EEC.11.A:** Describe the flow of electrons through circuits. • **TE.EEC.11.B**: Relate electrical quantities with respect to the mechanical analogs of force, work, power, and energy.	
Students will understand (abstract ideas) • Ex. connections, relationships, frameworks, etc.	**DOK Level**	**Students will understand (abstract ideas)** • Ex. connections, relationships, frameworks, etc.	**DOK Level**	**Students will understand (abstract ideas)** • Ex. connections, relationships, frameworks, etc.	**DOK Level**
• **TE.ENG.5.D.b.1**: Understand the nature of flight through Bernoulli's principle. • **TE.ENG.5.D.i.1**: Describe and diagram forces affecting an aircraft in flight. • **TE.ENG.5.D.a.1**: Design and create a fixed-wing vehicle. • **TE.ENG.5.D.b.4**: Compare the concepts of unpowered and powered flight. • **TE.ENG.5.D.i.4**: Identify the mechanisms to power fixed-wing aircraft and the effect on the forces involved .		• **TE.ENG.5.A.b.1**: Define the parts of a structure. • **TE.ENG.5.A.i.1**: Describe how materials, their orientation, and forces contribute to the stability of a structure. • **TE.ENG.5.A.a.2**: Design a structure to support various types of load cases.		• **TE.EEC.11.A.b.1**: Describe electricity as the flow of electrons. • **TE.EEC.11.A.i.1**: Determine whether current will flow in a circuit based on open/closed status. • **TE.EEC.11.A.a.1**: Predict the behavior of a circuit using the mechanical analogs of pressure, flow, and friction. • **TE.EEC.11.B.b.3**: Identify batteries, capacitors, and inductors as electrical energy storage devices. • **TE.EEC.11.B.a.2**: Calculate energy from the product of power and time .	
Students will do (active application)	**DOK Level**	**Students will do (active application)**	**DOK Level**	**Students will do (active application)**	**DOK Level**
Understanding Flight Principles:		**Understanding Material Properties and Structural**		**Understanding the Flow of Electricity:**	

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- I can explain how Bernoulli's principle helps us understand how things fly.
- I can identify and describe the forces (like lift, drag, thrust, and weight) that affect an aircraft during flight.

Designing and Testing Aircraft:
- I can design and build a simple fixed-wing aircraft.
- I can test different aircraft designs to see how changes in size, shape, and material affect how it flies.

Applying the Engineering Design Process:

- I can follow the steps of the engineering design process to plan, test, and improve my aircraft.
- I can use basic CAD software to design parts of my aircraft, like the wings or body.

Understanding Aircraft Power and Flight Mechanisms:
- I can explain how different parts of an aircraft, like engines or propellers, help it fly.
- I can describe how these parts affect the forces on the plane during flight.

Collaborative Problem-Solving and Communication:
- I can design and test an aircraft.
- I can explain the design choices and share what was learned from the trials.

Components:
- I can identify different materials used in construction and describe their properties.
- I can explain how the choice of materials affects the strength and stability of a structure.
- I can list and describe the main components of a structure, such as beams, columns, trusses, and foundations.

Analyzing Forces, Stability, and Load Cases:
- I can identify types of forces (e.g., tension, compression, shear) that act on structures.
- I can explain how these forces impact the stability and integrity of a structure.
- I can define different types of loads (e.g., static, dynamic, live, dead) that a structure may encounter.

Designing and Applying Engineering Principles:
- I can apply principles of engineering to create structural designs that meet load requirements.
- I can describe how the arrangement and alignment of structural components influence a structure's stability.
- I can analyze how the failure of one component can affect the integrity of the entire structure.

- I can describe how electricity flows in a circuit.
- I can describe electricity as the flow of electrons.
- I can predict the behavior of a circuit using the mechanical analogs of pressure, flow, and friction.

Building and Testing Simple Circuits:
- I can build a simple circuit using a battery, wires, and a light bulb.
- I can create simple circuits with batteries and LED lights.
- I can determine whether current will flow in a circuit based on open/closed status.

Understanding Electrical Components:
- I can identify batteries, capacitors, and inductors as electrical energy storage devices.
- I can calculate energy from the product of power and time.

Understanding Circuit Types:
- I can explain the difference between series and parallel circuits.

Relating Electrical Quantities:
- I can relate electrical quantities with respect to the mechanical analogs of force, work, power, and energy.

Domain-specific Vocabulary

- Aerodynamics
- Thrust
- Drag
- Lift
- Gravity
- Angle of Attack
- Airfoil
- Stall
- Flaps
- Ailerons
- Elevator
- Rudder
- Yaw

Domain-specific Vocabulary

- Forces
- Stability
- Structure
- Beams
- Columns
- Trusses
- Foundations
- Tension
- Compression
- Shear
- Dead Load
- Live Load
- Static Load

Domain-specific Vocabulary

- Electricity
- Electron
- Current
- Circuit
- Open Circuit
- Closed Circuit
- Mechanical Analog
- Pressure
- Flow
- Friction
- Conductor
- Insulator
- Resistance

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• Pitch • Roll • Fuselage • Cockpit • Landing Gear • Altitude	• Dynamic Load • Load-Bearing Capacity	• Superconductor • Semiconductor

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PLC Question #1: What do we want all students to know and be able to do?

Module 4: Science of Speed ✅		Module 5: Fundamentals of Woodworking ✅			
Priority Standard(s) • **TE.TDL.1:** Students will be able to select and use transportation technologies.		**Priority Standard(s)** • **TE.AC.2**: Students will be able to select and use architecture and construction technologies		**Priority Standard(s)** •	
Supporting Standard(s) • N/A		**Supporting Standard(s)** • N/A		**Supporting Standard(s)** •	
Learning Outcomes		**Learning Outcomes**		**Learning Outcomes**	
Students need to know (concrete knowledge) • Ex. vocabulary, facts, concepts, etc.	**DOK Level**	**Students need to know (concrete knowledge)** • Ex. vocabulary, facts, concepts, etc.	**DOK Level**	**Students need to know (concrete knowledge)** • Ex. vocabulary, facts, concepts, etc.	**DOK Level**
• **TE.TDL.1.A:** Show an awareness of transportation vehicles and the role they play in society. • **TE.TDL.1.B:** Analyze and explain what transportation vehicles are and how transportation vehicle systems work.		• **TE.AC.2.A**: Demonstrate the safe and appropriate use of all tools common to the construction industry.		•	
Students will understand (abstract ideas) • Ex. connections, relationships, frameworks, etc.	**DOK Level**	**Students will understand (abstract ideas)** • Ex. connections, relationships, frameworks, etc.	**DOK Level**	**Students will understand (abstract ideas)** • Ex. connections, relationships, frameworks, etc.	**DOK Level**
• **TE.TDL.1.A.b.1**: Identify that transportation systems allow people and goods to be moved from place to place. • **TE.TDL.1.A.i.1**: Explain how transporting people and goods involves a combination of individuals and vehicles. • **TE.TDL.1.B.a.3**: Identify vehicle structural parts and cosmetic parts. • **TE.TDL.1.B.a.4**: Demonstrate knowledge of collision energy management principles		• **TE.AC.2.A.i.1**: Demonstrate proficiency in the use of simple hand tools such as hammers, screwdrivers, handsaws, planes, sandpaper, nail sets, aviation snips, framing squares, utility knives, chalk lines, etc. • **TE.AC.2.A.i.2**: Demonstrate the safe and proper use of all applicable power tools, such as circular saws, table saws, saber saws, drills, planers, sanders, pneumatic nail guns, and impact wrenches. • **TE.AC.2.C.i.4**: Demonstrate use of the standard measuring system to the 1/16” and be able to convert to decimal and metric equivalency. • **TE.AC.2.C.b.3**: Communicate ideas and plans through sketching or drawing. • **TE.AC.2.F.b.2**: Describe simple processes and		•	

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		materials that are used to construct a structure.			
Students will do (active application)	**DOK Level**	**Students will do (active application)**	**DOK Level**	**Students will do (active application)**	**DOK Level**
Understanding Transportation Systems: • I can explain how transportation systems move people and goods from place to place. • I can describe how vehicles and individuals work together in a transportation system. **Understanding Vehicle Components:** • I can identify the structural and cosmetic parts of a vehicle. • I can apply principles of collision energy management to improve vehicle safety and performance. **Applying the Engineering Design Process:** • I can follow the engineering design process to develop a CO2 dragster. • I can recognize when I need to return to previous steps in the design process to refine my solution. • I can explain how iteration and redesign lead to a more effective final product. **Testing, Analyzing, and Improving Designs:** • I can create and test a prototype of my dragster to evaluate its performance. • I can analyze the results of testing and modify my design to improve speed and aerodynamics. • I can use data from my tests to make informed design decisions.		**Measuring and Planning:** • I can measure wood accurately to the nearest 1/16 inch. • I can convert standard measurements to decimal and metric equivalents. • I can communicate my design ideas through sketching and drawing. **Using Tools Safely and Effectively:** • I can correctly and safely use hand tools such as hammers, screwdrivers, and handsaws. • I can demonstrate the proper use of power tools, including drills and sanders. • I can identify and use the right tools for each step of the construction process. **Building with Skill and Accuracy:** • I can select the appropriate materials for building a sturdy birdhouse. • I can follow a step-by-step process to cut, assemble, and fasten my birdhouse. • I can describe and apply different joining techniques such as nailing and screwing. • I can check my birdhouse for accuracy and make adjustments if needed. • I can explain how material selection and craftsmanship affect durability. **Reflecting on Craftsmanship:** • I can reflect on my process and identify ways to improve my woodworking skills.		•	
Domain-specific Vocabulary		**Domain-specific Vocabulary**		**Domain-specific Vocabulary**	
• Aerodynamics • Drag • Friction • Thrust • Gravity • Momentum • Inertia • Acceleration		• Blueprint • Scale • Dimensioning • T-square • Hammer • Handsaw • Drill • Sander		•	

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• Velocity • Force • Mass • Energy Transfer • Collision Energy Management • Axle • Chassis • Prototype • Iteration • Redesign • Optimization • Failure Analysis • Constraints • Criteria • Blueprint • Wind Resistance • Weight Distribution • Balance • Center of Mass	• Clamps • Wood Glue • Fasteners • Cutting • Nailing • Screwing • Pre-drilling • Countersink • Sanding • Finishing • Staining • Weatherproofing • Durability	