Introduction to Guitar Building/Design Math

- Add, subtract, multiply, and divide whole numbers, with and without a calculator
- Use a standard ruler and metric ruler to measure.
- Add, subtract, multiply, and divide fractions.
- Convert decimals to percentages and percentages to decimals
- Recognize and use metric units of length, weight, volume, and temperature.
- Convert measurements from standard to metric and metric to standard

Measurement, Accuracy and Quality

- Describe measurement’s role in manufacturing
- Identify types of measurement used in manufacturing
- Understand the importance of calibrating instruments
- Select proper tools for measurement
- Convert units from one measurement system to another
- Lists characteristics of measurement tools
- Perform measurements with general and precision tools
- Describe common measuring errors and proper techniques
- Describe measuring systems

History and Context of Guitar

- Identify origins of guitar
- Identify stringed instruments that lead up to the guitar
- Identify famous luthiers, and guitar manufacturers
- Identify components of modern guitar
- Identify role of guitar in modern and historic music

Physics of Sound

- Identify and explain basic concepts of kinetic energy as it pertains to the guitar
- Identify and explain basic wave concepts as they pertain to sound
- Identify basic vibrating systems and describe sound characteristics in those systems
- Identify basic musical systems for describing sound characteristics

Construction, Safety and Shop Skills

- Show working knowledge of fundamental shop skills
- Understand how tools and fixtures are used in constructing a guitar
- Demonstrate use of common machine tools
- Demonstrate basic skills of fabricating, assembling, and testing a product
- Demonstrate proper use of wood-working tools
- Select appropriate tools for layouts and inspection
- Demonstrate understanding of basic electrical safety
- Identify tools and procedures to form, cut, finish, fasten, and repair
- Follow safety manuals, instructions, and requirements
- Demonstrate proper use of protective equipment
- Name and describe fire hazards and how to control them
- Recognize unsafe practice in forming, separating, and combining processes
- Evaluate safety and fitness of tools, materials fixtures, and jigs
- Demonstrate proper use of a band saw, drill press, disk sander, air compressor and various floor mounted power tools
- Explain when it is appropriate to ask for supervisory help
- Demonstrate proper disposal of used applicators (rags, etc.) and left over finishes

**Electricity and Electronics**

- Describe how voltage, current, resistance, and power are related
- Use Ohm’s law to calculate the current, voltage, and resistance in a circuit
- Use the power formula to calculate how much power is consumed by a circuit
- Describe the differences between series and parallel circuits
- Make voltage, current, and resistance measurements using electrical test equipment
- Construct an electrical circuit from a wiring diagram
- Explain how electricity is created in a magnetic/Piezo circuit

**Manufacturing Computing**

- Explain how and where computers are used in manufacturing
- Demonstrate knowledge of computer software applications in manufacturing
- Explain how production rates are determined
- Explain inventory control, material forecasting, and capacity planning
- Knowledge of work processing, spreadsheets, databases, statistical, and graphics software
- Understand and apply budgeting and master scheduling techniques

**Guitar Construction**

- Define product and process control and explain the importance of each
- Explain factors that affect work in progress
- Use a flow diagram for producing a product
- List major elements in process planning
- Produce a functional and playable guitar

**Guitar Setup, Guitar Repair and Quality Assurance**

- Identify the components and process for correct setup of guitar
- Use troubleshooting to identify the problem or source of the problem
- Develop solutions using a structured problem solving process
- Use appropriate testing equipment and tools for diagnosing the problem
- Implement the correct strategies to remedy the problem
- Verify correction strategy to remedied the problem

**Current Guitar Market, Manufacturers and Suppliers**

- Identify companies and organizations involved in manufacturing guitars and guitar equipment
- Identify companies and organizations involved in selling guitar equipment
- Identify companies and organizations involved in supplying guitar equipment components
- Explain ways a company or organization markets itself, including choosing a name, designing logos and promotional materials, advertising, and the importance of word-of-mouth

Wood – Types, Processes and Management
- Behaviors and characteristics of manufacturing materials
- Characteristics of metallic materials
- Characteristics of plastic materials
- Characteristics of wood materials
- Characteristics of ceramic materials
- Characteristics of composite materials

Project Management and Evaluation
- Processes used to form metallic materials
- Processes used to form plastic materials
- Processes used to form wood materials

Standard Conditioning and Finishing Materials
- Processes used to condition metallic materials
- Processes used to condition plastic materials

Basic CADD Skills
- Create a scaled drawing
- Perform drawing set up
- Construct geometric figures
- Create text using appropriate style and size to annotate drawings
- Use and control enhancement tools accurately
- Create 2D models
- Create objects using primitives
- Revolve a profile to create a 3-D object
- Utilize geometry editing commands
- Utilize non-geometric commands
- Control coordinates and displays
- Plot drawings on media using correct layout and scale
- Use layering techniques
- Properly apply dimensioning according to drafting discipline
- Minimize file size
- Knowledge of the coordinate system to identify multiples axis (e.g. X, Y, Z)