Exploring Innovative STEM Education Through Guitar Design and Manufacture

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Hosted by Purdue University

Presented by: Mark French-Purdue University- IN, Doug Hunt-Southern Wells High School-IN, Mike Aikens Butler County Community College-PA, Tom Singer-Sinclair Community College-OH, Debbie French-New Philadelphia High School-OH,

At the completion of this faculty development workshop, participants will have experienced an innovative project based STEM curricula including hands-on experiential learning and cutting edge technology for the day-to-day classroom experience. The solid body electric guitar project will be introduced as an innovative vehicle for teaching concepts in Science, Technology, Engineering and Mathematics.

Monday- July, 26 2010

AM SESSION

8:30 – 9:00	Welcome • Introductions and Workshop Overview • Administrative Paperwork o W-9 Incentive Payee Form, Attendance Form, Photo Release Form, etc.
9:00 – 9:45	Guitar Primer
9:45 – 10:00	Overview of Workbook and Learning Activities
10:00 – 10:15	Break
10:15 – 10:45	Guitar Headstock Design for CNC Router Demonstration
10:45 – 12:00	Lab for Headstock Design, 3D Virtual Modeling and/or Cost Analysis
12:00 – 1:00	Lunch - Provided

PM SESSION

1:00 – 1:30	Shop Orientation, Safety and Component Selection
1:30 – 3:45	Task 1 – Body Sculpting (optional) – Power planer, rasps & bladder sander **NO FLY ZONE ALERT**
	Task 2 – Neck - separate from blank, file/sand neck & headstock **NO FLY ZONE ALERT**
	Task 3 – Drill pickup access hole and Jack hole
	Task 4 - Glue fret board onto neck
4:00 – 4:30	Seal body with Bona Seal
5:00 – 5:30	First application of clear Bona Mega

Homework: register and record a skype account (SKYPE.COM) to be used in Wednesday's lab.

Tuesday- July, 27 2010

AM SESSION

8:00- 10:00	Science activities – Debbie French
10:00 - 10:15	Break
10:15 – 11:15	Technology & Math activities Doug Hunt
11:15 – 12:00	Lab for STEM Activities
12:00 – 1:00	Lunch - Provided

PM SESSION

1:00-1:15	Second coat of finish on guitar bodies

1:15-1:45	Drill and install fret dots. (wood and plastic available)
1:45-3:00	Sand 12” radius on fret board, shape/sand neck and headstock. Apply sealer
3:00-3:15	Fretting demonstration
3:15 – 4:45	Fretting (seal fret board and neck before fretting)
4:45 – 5:15	Swirl Paint Demonstration
5:15- 5:30	Apply third coat of finish on body and first coat on neck

Wednesday- July, 28 2010

AM SESSION

8:00-8:30	Apply last coat of finish to body and neck
8:30-10:00	Tom Huber – Physics/Science
10:00-10:15	Break
10:15 – 12:00	Introduction to On-Line Collaborative Design Tools • Skype (VOIP), check headset and mic connection • Adobe Connect • Autodesk Streamline / Buzzsaw Remote Design Team Exercise using Solid Body Electric Guitar Neck and/or Hollow Body Acoustic Electric Guitar Neck files found on instructor resource DVD. • Log on to Adobe Connect • Design project will be discussed using virtual classroom (Adobe Connect) • Remote design teams work on a new **head stock** design. • Post results on Streamline • In the CADD system, cut new headstock off of neck and save as an STL file. This file will be used to create a scaled physical model (prototype) of the new design. • Print designs if so desired.

12:00 – 1:00	Lunch - Provided

PM SESSION

1:00 – 2:00	Complete Fretting and Install side markers.
2:00-2:15	Fret Leveling demonstration
2:15- 5:30	Fret Leveling and Install Hardware on body

Thursday- July, 29 2010

AM SESSION

8:00 – 9:00	Curriculum integration discussion
9:00 – 10:00	Networking and Learning Activity Development
10:00-10:15	Break
10:15 – 10:45	Participant-centered discussion of newly developed learning activities
10:45 – 12:00	Introduction to soldering and electronics wiring harness
12:00-1:00	Lunch - Provided

PM SESSION

1:00-1:30	Nut making and installation demonstration
1:30 – 3:00	Solder wiring harness and install electronics
3:00 – 4:00	Neck and string installation demonstration
4:00 – 5:30	Attach Neck and string guitar

Friday- July, 30 2010

AM SESSION

8:00 – 8:30	Breakfast
8:30 – 9:00	Distribute Materials to Support Activities
9:00 – 10:00	Intonation and tuning demonstration
10:00-10:15	Break
10:15 – 12:00	Set-up, intonation and tuning
12:00 – 1:00	Lunch - Provided

PM SESSION

1:00 – 1:30	Evaluation
1:30-2:00	Group Picture
2:00 - ?	Finish guitar set-up

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