













**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. **Guitar Primer** 9:00 - 9:45Overview of Workbook and Learning Activities 9:45 - 10:00 10:00 - 10:15Break 10:15 - 10:45 Guitar Headstock Design for CNC Router Demonstration 10:45 - 12:00Lab 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.

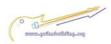
Tuesday- July, 27 2010

## 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.

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## 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

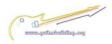
# Thursday- July, 29 2010

#### 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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