Designing a Guitar Body

**Josh Gary & Wade Wells**

**Description of Activity**

* After a quick guitar style slideshow featuring several different styles of guitar.
* Students design a guitar body with Vcarve Pro CAD software.
* 2nd and 3rd year Woods Manufacturing Students.

**Learning Objectives:**

**(List measureable objectives)**

1. Students will be able to investigate and explore guitar body style option on Google.
2. Students will be able to sketch a few options
3. Students will be able to create CAD vectors starting with a DXF file of the electronics and pockets of the guitar.
4. Students will be able to create CAM tool paths to program our Shopbot CNC to cut out guitar bodies.

**Standards:**

**Oregon Manufacturing Skill Sets.**

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| Expand MNPJ01 -  Apply measurement and scale concepts in drafting and design. | MNPJ01 - Apply measurement and scale concepts in drafting and design. |

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|  | Expand MNPJ03 -  Create technical sketches using drafting procedures. | MNPJ03 - Create technical sketches using drafting procedures. |

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|  | Expand MNPJ04 -  Use a CADD system and procedures. | MNPJ04 - Use a CADD system and procedures. |

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|  | Expand MNPJ05 -  Detail projection views/components. | MNPJ05 - Detail projection views/components. |

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|  |  | MNPJ06 - Explore mechanical drafting/design concepts and problems. |
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Common Core State Standards

CCSS.Math.Content.HSF-IF.C.7e

CCSS.Math.Content.HSF-LE.A.2

Next Generation Science Standards

HS-PS-3-3: Design, build, and refine a device that works within given constraints to convert one form of energy in another form of energy.

**Materials Required:**

* Shopbot CNC
* CNC Bits
* Computers with Vcarve software
* Glued up guitar blank
* Tape measures/calipers
* CAD file

**Safety:**

**safetys:**

* Safety Glasses
* Ear Protection

**References:**

* Google Image search
* Gallery of Guitars at <http://www.guitarbuilding.org/gallery-of-guitars/>
* VCarve Pro tutorial on toolpathing <http://support.vectric.com/tutorials/V8/WingSpar/WingSpar_GS.html>

**Activity:**

* This is a capstone project for second and third year students already familiar with CAD and CAM
* Students have also successfully completed several projects on the Shopbot CNC.
* Several formative assessments are built into the project.
	+ Students search and sketch a variety of guitar styles.
	+ When sketches are approved they move to VCarve Pro and open Guitar Pocket template.
	+ Students draw and design their body with constant checks from the teacher.
	+ Once CAD drawing is approved we move to developing CAM toolpathing and design.
	+ Students must have a firm understanding on what CNC tooling is most effective in profile and pocket toolpathing.
	+ Student and teacher will run a cut simulation.
	+ Cutpaths are saved after toolpath simulation is successful.
	+ Students glue up Guitar blank or used premade blank.
	+ Shopbot CNC is setup and blank is cut.

**Assessment:**

* Several formative assessment checks are included in the process.

**Reviewing Faculty Cohort Members:**

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