Title: Purchasing Lumber for Guitars

**Learning Objectives:**

* **Calculate total board feet of a guitar and cost for the species used.**
* **Accurately measure lumber using inches**

**Materials Required:**

* Wood pieces cut to different sizes
* Parts of a guitar for measurement
* Calculators
* Measurement tools, tape measures, rulers

**Safety:**

**safetys:**

- Minor safety concerns with handling lumber, such as splinters or dropping on feet. Closed toe shoes should be required while measuring lumber with rulers.

**Pre-Activity:**

* Ask students how lumber is purchased at Lowe’s or Home Depot
* Compare the method of selling wood by linear feet at Lowe’s or Home Depot to a lumberyard. Explain lumberyards for furniture grade lumber do not sell wood by linear feet, but by board feet.
* Ask students to try to calculate board feet for a sample board with limited information

**Activity**

* Demonstrate Dimensional Analysis in relation to the board feet equation and why 144 in3 is the volume measurement for 1 board foot.
* Show PowerPoint on Calculating BDFT and work through a few sample problems
* Set up stations in the lab with different sized pieces of wood marked with a different number.
* Allow students time to measure each block of wood and calculate board feet for each board. This should be done on a piece of paper.
* Give students a problem involving a business from overseas that wants your woodworking business to produce. The measurements are in metric and conversions must occur. Solve one problem using board feet converted to metric.

**Conclusion**

* Take one guitar body and measure the overall size of each part
* Calculate board feet for each part
* Calculate the total cost for each part and the total cost of the guitar.

**References**

<http://www.oshealumber.com/>

<https://hardwoodstore.com/how-calculate-board-footage>

**Standards**

**PCCS:**

**CC.2.3.HS.A.12**

Explain volume formulas and use them to solve problems.

**CC.2.1.HS.F.4**

Use units as a way to understand problems and to guide the solution of multi‐step problems.

**CC.2.3.7.A.1**

Solve real‐world and mathematical problems involving angle measure, area, surface area, circumference, and volume

**CC.2.3.6.A.1**

Apply appropriate tools to solve real‐world and mathematical problems involving area, surface area, and volume.

**Standards for Technological Literacy:**

12P Use computers and calculators to access, retrieve, organize, process, maintain, interpret, and evaluate data and information in order to communicate