
Instructor: Kenneth L. Jagon

Subject: Woodworking

Fret Neck Assembly, Fret Spacing

Description of Activity

This activity produces a guitar which has all of its frets located in the proper place along the neck such that the instrument plays in tune in all positions. Throughout history, specific spacing for each fret of a stringed instrument necessitates a precise measurement based on the exact scale length of the individual instrument. Pythagoras was the first known person to experiment with musical scalar intervals around 500 BC. Later, in the 16th century, Galileo's father, Vincenzo Galilei, was credited with developing the "Rule of 18," used for centuries by instrument makers to determine the fret scale length of their instruments. For any given vibrating string length, they would simply divide the length of the string by 18, yielding the distance from the nut to the first fret. By subtracting that figure from the original string length, they arrived at a new, shorter scale measurement, which was then divided once again by 18, which resulted in the distance between the first and second frets. They continued in this manner until the entire scale was determined. Over the years, the constant divisor 18 has been refined to 17.817 (derived from a formula based on $2^{1/12}$, or the 12th root of 2), resulting in more accurate scales. This activity is suitable for grades 9-12.

Learning Objectives:

(List measurable objectives.)

1. Students will determine accurate fret locations by calculating the exact fret locations for the first five fret positions when given a specific scale length of a stringed instrument.
2. Students will watch YouTube videos on guitar neck assembly, fretboard assembly, and fret installation.
3. Students will identify the different types of neck and fretboard assembly tools.

Standards:

STANDARD: 6	Students will use the tools correctly, know how to use hand tools and power tools.
BENCHMARK: 6.1	Students demonstrate that they can use all the tools safely and correctly.
BENCHMARK: 6.2	Given a job, the student will be observed on how they use tools accordingly.

Materials Required:

1. A computer with internet access for each student
2. <https://www.youtube.com/watch?v=GjXEZpofyul> , <https://www.youtube.com/watch?v=oSmm-HINqi0> ,
<https://www.youtube.com/watch?v=GjXEZpofyu>
3. Tape measure to accurately measure the width and length of various wood samples
4. Guitar kits (prior to finish and assembly!)

Safety:

Always wear safety glasses in a lab setting.

References:

- Website: www.guitarbuilding.org
ASDOE Curriculum

Assessment:

Students will write a reflection on the youtube video on how to assemble a guitar neck, fretboard, and fret installation.

Reviewing Faculty Cohort Members:

[Kenneth Jagon](#) NVTHS, Construction Trades, kenneth.jagon@doe.as

[Seanette Thompson](#) NVTHS Mathematics seanette.thompson@doe.as

Ailen Borres NVTHS Science ailen.borres@doe.as