

Thickness Tuning



Question

Does the thickness of a guitar string affect how it sounds when played on the same note?

Abstract

This experiment's purpose is to find out what changes happen to a thick string when it is tuned higher. If two guitar strings of different thicknesses are tuned to the same note, then the thicker string will be flat and the thinner string will be sharp because the thinner string will vibrate faster because it has less mass than the thick string. The A string (the second lowest string) will be tuned to high E. Then, a tuner will be used to record how many cents flat or sharp the A string is compared to the high E string. The previous step will be repeated 20 times. In the beginning of the results, the A and E string stayed relatively in tune, but then the A string started becoming flat. Near the end the A string stayed consistent in its flatness. In conclusion, the A string slowly became flat because the thick string was not made for being stretched so tight. The thickness of a string does affect the sound.

Hypothesis

If two guitar strings of different thicknesses are tuned to the same note then the thicker string will be flat and the thinner string will be sharp because the thinner string will vibrate faster because it has less mass than the thick string.

Materials

- ❖ A guitar
- ❖ Standard metal guitar strings
(make sure all six strings are metal)
- ❖ A tuner that displays cents

Procedure

1. Set up the tuner in a quiet room.
2. Tune the low E (the thickest string) and high E (The thinnest string) to the same octave the High E is on.
3. Gently Pluck the low E with your finger.
4. Observe the sound. Take note if the tuner shows how many cents flat or sharp the note is.
5. Repeat steps 3 and 4 with the high E.
6. Repeat steps 3-5 20 times.

Procedure

Independent variable: The diameter of the string

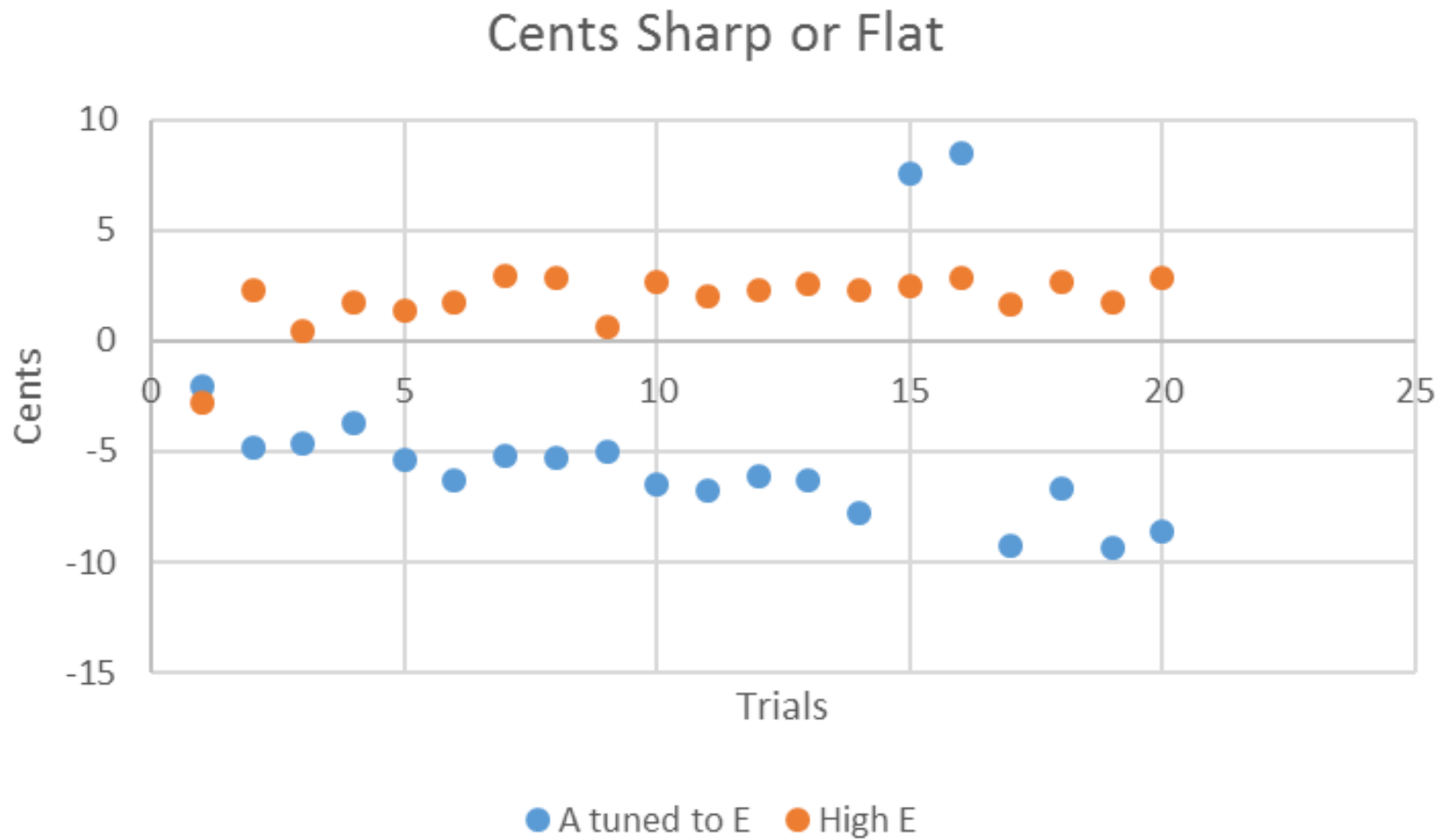
Dependent variable: how the string sounds, like muffled, or flat and sharp.

Constant or controlled variables: the tuning of the string, the material it is made of, and the force at which I pluck it.

Results and Data

Trial	A tuned to E	High E
1	-2.04	-2.8
2	-4.8	2.3
3	-4.6	0.4
4	-3.7	1.7
5	-5.4	1.4
6	-6.3	1.7
7	-5.2	2.9
8	-5.3	2.8
9	-5	0.6
10	-6.5	2.7
11	-6.8	2
12	-6.1	2.3
13	-6.3	2.6
14	-7.8	2.3
15	7.6	2.5
16	8.5	2.8
17	-9.3	1.6
18	-6.7	2.7
19	-9.4	1.7
20	-8.6	2.8

Graph



Conclusion

The thickness of a guitar string does affect the way it sounds. The thicker the string the slower it vibrates, the thinner it is the faster it vibrates. It seems that thick strings become flatter faster when they are stretched more than they are intended. The high E never got out of tune as severely as the A did when tuned to high E. Thick strings are not meant to be stretched that far. My hypothesis was correct.

"Rules for All Projects."

Student Science

Works Cited

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