

PLUCK A RUBBER BAND

A. Question: *What are the factors affecting pitch?*

B. Materials Needed:

1. A small medium thick rubber band.

C: Procedure:

1. Place the rubber band between thumb and forefinger, and stretch it a little.
2. Hold it close to your ear and pluck it with the other hand.
3. Stretch the rubber band by widening the gap between thumb and forefinger and pluck again. What pitch do you hear now?

D: Anticipated Results:

Students should observe that after widening the gap between the fingers by stretching the rubber band, the pitch stayed about the same.

E: Thought Questions for Class Discussion:

1. Did the pitch of the sound change after widening the gap?
2. Which properties of the rubber band changed while being stretched?
3. What property changes when a guitar string is tightened?
4. Which properties do not change when a guitar string is tightened?
5. How do these properties compare to those of the rubber band?
6. In what ways can we change the pitch of a guitar string?
7. How could we change the pitch of the rubber band?

F: Explanation:

When the rubber band stretched and was plucked again, the pitch of the sound was staying about the same, if not getting a little lower. This is definitely contrary to what one would expect, which is a higher pitch for the stretched rubber band.

When a guitar string is tightened, the pitch becomes higher, because the tension is higher, thus the string vibrates with higher frequency; the length and the density of this string, however, is staying constant.

With the stretching of the rubber band, all three properties: tension, length, and density change. The higher tension tends to increase the pitch, but this is compensated by the increase of the length, which tends to lower the pitch.

When the length of the rubber band is held constant, the pitch changes similarly like a regular guitar string. This can be done by stretching the rubber band over an empty open box.