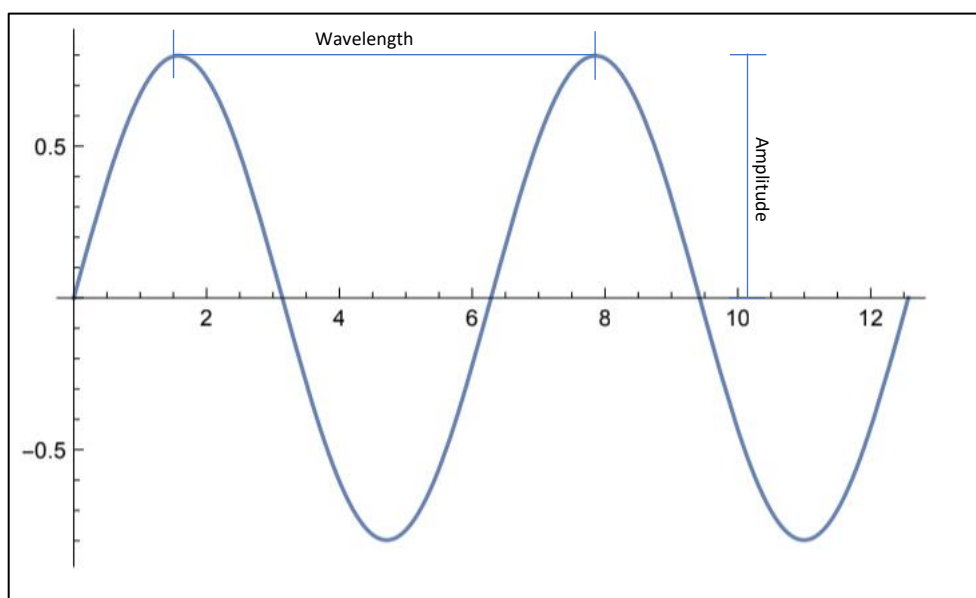


Wavelength and Sound: Build your own ukulele demonstration

SEEd Standard Grade 4.3.1

Introduction:

The sounds that we hear every day are made up of invisible waves that move through the air. What we hear is dependent on a few different properties of the wave, such as the wavelength and amplitude. The wavelength corresponds to the pitch that you hear, and the amplitude affects the volume. In this demonstration, students will explore the relationship between wavelength and pitch by building their own homemade ukulele.



Materials:

1. A Piece of Cardboard (1 per student)
2. Rubber bands (1 per student)
3. A ruler
4. A Pencil or a pen
5. Materials to decorate with (optional)

Instructions:

1. Using a ruler, measure the wavelength for the following notes down the long side of the cardboard (hot dog style) and label them. Note: the note that you hear when your

ukulele is done will probably not be “in tune” with a standardized note on something like a piano. This is because the tension on the “string” as well as the material it is made out of will also affect the pitch that is heard. However, the relationship between the notes in our “scale” are the same as the standard scale, so the music that you make will still sound correct!

Note:	C	D	E	F	G	A	B
Wavelength:	20.9 cm	18.6 cm	16.63 cm	15.7 cm	14 cm	12.4 cm	11.1 cm

2. Stretch the rubber band around the cardboard so that it follows the notes down the long side of the cardboard (hot dog style).
3. Place the pencil or pen between the rubber band and the card board. This should separate the two so that the rubber band can vibrate and produce a noise when plucked. If you Move the pencil/pen to one of the various notes and pluck the rubber band, it will change the pitch as it changes how much of the rubber band can vibrate at a time. Changing the “length” of the rubber band changes the pitch of the note!
4. (Optional) Decorate your ukulele however you want. You can color it with markers, cover it with stickers, or even glue feathers on it. The choice is yours!
5. Have fun playing your ukulele, and try out some of the songs included in this handout.
6. When you are finished, if you do not wish to keep your ukulele, please recycle any recyclable materials (such as the cardboard) and safely dispose of everything else in the trash.

Note: Instead of using a piece of cardboard for the ukulele, this demonstration can be done using only a ruler, rubber band, and pencil. Place the rubber band around the ruler instead and use the markings on the ruler to see where the notes should be “played”.

Song List

Twinkle Twinkle Little Star:

CCGGAAG
FFEEDDC
GGFFED
GGFFED
CCGGAAG
FFEEDDC

Mary had a Little Lamb:

EDCDEEE
DDDEEE
EDCDEEE
EDDEDC

London Bridge:

GAGFEFG
DEFEFG
GAGFEFG
DGEC

Old MacDonald had a Farm:

GGGDEED
BBAAG
DGGGDEED
BBAAG
DDGGG
DDGGG
GGGGGG
GGGGGG
GGGDEED
BBAAG

Jingle Bells:

EEEEEEEGCDE
FFFFFFEEE
EDDEDG
EEEEEEEGCDE
FFFFFFEEE
GGFDC

Hot Cross Buns:

EDCEDC
CCCCDDDD
EDC

Are You Sleeping?

CDECCDEC
EFGFEG
GAGFEC
GAGFEC
CGCCGC

Rain, Rain, Go Away:

GEGGE
GGEAGGE
FFDDFFD
GFEDECC