

# TONGUE DEPRESSOR HARMONICA

A simple way to make a familiar instrument!

## Curriculum topics:

- Energy
- Instruments
- Properties of waves
- Sound
- Senses

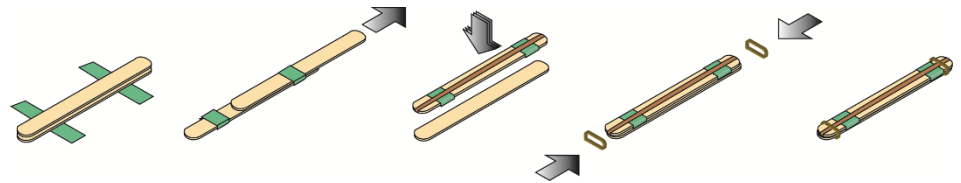
## Subject:

Life Science, Physical Science, Art

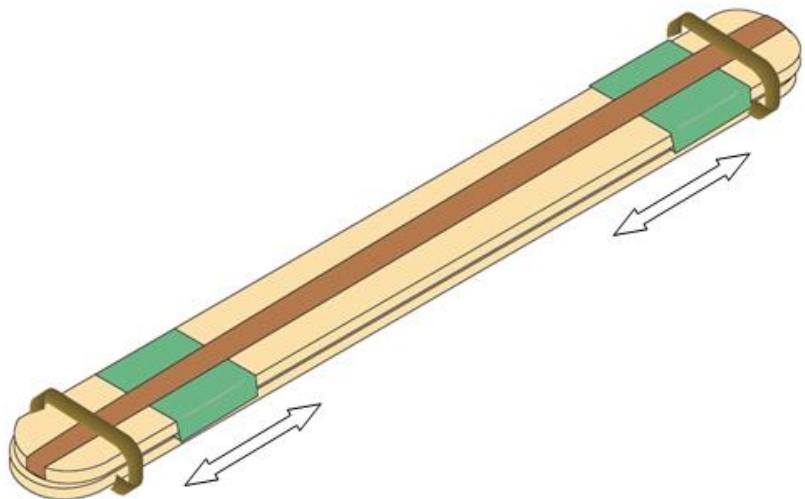
**Grade range:** K – 8

## Who we are:

Resource Area for Teaching (RAFT) helps educators transform the learning experience by inspiring joy through hands-on learning.



People of all ages love the Kazoo-like sounds that come from this fun-to-make and easy-to-play instrument. The RAFT harmonica uses a rubber band vibrating between two tongue depressors (jumbo craft sticks) to make different sounds. Move the paper sliders to change the sound and to explore wave properties, energy, and more! Start your own RAFTy band with this handy device!



For more ideas visit  
<https://raft.net/resources-2/>

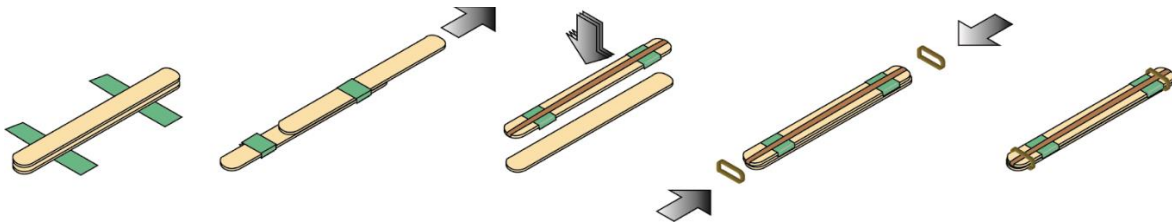
# Materials required

- Craft sticks, jumbo (x2)
- Cardstock strips (x2)
- Rubber bands, small (x2)
- Rubber band, large (x1)
- Tape, not included

**WARNING: CHOKING HAZARD – Small parts not for children under 3 yrs.**

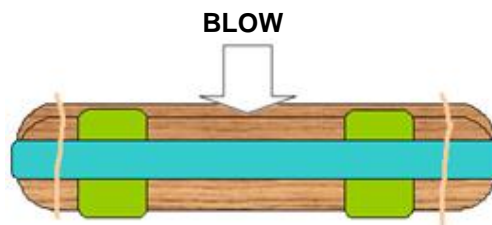
## Set-Up

- 1 Stack the jumbo craft sticks together. Wrap a cardstock strip around one end of the stack and secure with tape. Repeat for the other end using the other cardstock strip (see below).
- 2 Remove one craft stick and save to use in step 4. Make sure the cardstock “sliders” move freely.
- 3 Stretch the large rubber band lengthwise and untwisted around the craft stick and sliders.
- 4 Stack the previously removed craft stick on top of the craft stick with sliders and large rubber band.
- 5 Double wrap the small rubber bands around the ends of the stacked craft sticks.



## To do and notice

- 1 Hold the harmonica by the paper sliders. Tuck in your lips and lightly press the side of the harmonica onto the lips. Blow into the gap between the craft sticks and note the sound produced.
- 2 Blow with different relative strengths and compare the new sounds with the previous sounds.
- 3 Move the sliders to different positions (one at a time to avoid splinters). Blow into the harmonica, noting any differences in sound produced for each slider position.



## Content Standards:

### NGSS

Sound, Wave Properties

[1-PS4-1](#)

[1-PS4-4](#)

[4-PS4-1](#)

[MS-PS4-2](#)

Senses, Information Processing

[4-LS1-2](#)

Definition & Conservation of Energy

[4-PS3-2](#)

[4-PS3-4](#)

# The science behind the activity

Sound is caused by **vibrations** that travel in the form of **waves** through a medium (such as air) and into the ear. For the Tongue Depressor Harmonica, the **pitch**, or frequency, produced is equal to the number of times per second (**hertz**) that the rubber band vibrates. Higher pitched sounds are created by waves with a higher frequency. Players can change the pitch by moving the paper sliders or blowing air between the sticks with more force. In general, a shorter length of material (string, rubber, metal) will vibrate more quickly (at a higher pitch) than longer lengths. When the sliders are closer together, the pitch will be higher because there is less length of rubber band available to vibrate.

The airflow around the rubber band will also affect the sound. The air flowing above and below causes the rubber band between the craft sticks to vibrate due to air turbulence. The rubber band, like most objects, has a **natural frequency** at which it vibrates most easily. The air blown across the rubber band moves the rubber band out of its rest position and in so doing stores energy in the material (**potential energy**). The rubber band then moves towards and then beyond its rest position with **kinetic energy**, which is energy of moving objects. The to and fro motion of the rubber band in this manner is an example of energy being repeatedly converted between potential and kinetic energy. The range of the rubber band's movement away from its rest position, or displacement, can be reduced by slightly pressing the sticks closer together while blowing air between them. This also reduces the amount of potential energy stored in the material and hence reduces the frequency of vibration, resulting in a lower sound.

## Learn more

- Create and play a tune or try to mimic the sound of familiar animals
- Use the harmonica to perform a scene from your favorite movie or book
- Go online and research the history of the harmonica or other instruments
- Use wider paper or cardstock to make new sliders. How will this change the sound? Build a sample and find out!

Visit <https://raft.net/resources-2/> to view the following related activities!

Buzz Off  
Straw Oboes  
Cap Maracas  
Glove-A-Phone  
VHS Shamisen  
Making Waves  
Pan Pipes

## Resources

- Interactive wave simulation - <http://bit.ly/WaveonString>
- YouTube video (2:49), assembly – <http://bit.ly/RAFTHarmonica>