

# TONGUE DEPRESSOR HARMONICA

A simple way to make a familiar instrument!

## Curriculum topics

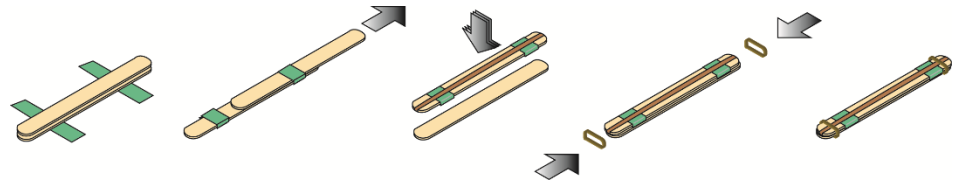
- Energy
- Engineering/Design
- Musical Instruments
- Wave Properties

## Subjects

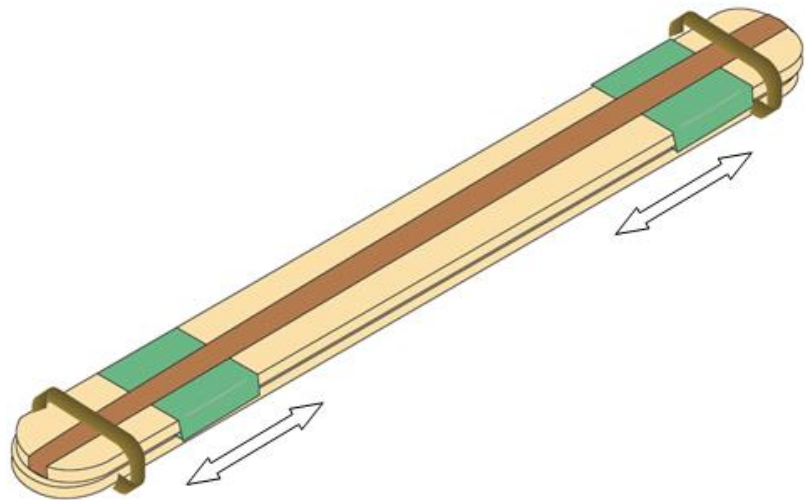
- Engineering
- Performing Arts
- Physical Science

**Grade range:** K – 8

**Who we are:** Resource Area for Teaching (RAFT) helps 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. This 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 explore wave properties, energy, and more! Start your own Rafty band with this handy device!



**Share Your feedback!**  
<http://bit.ly/RAFTkitsurvey>

# Materials

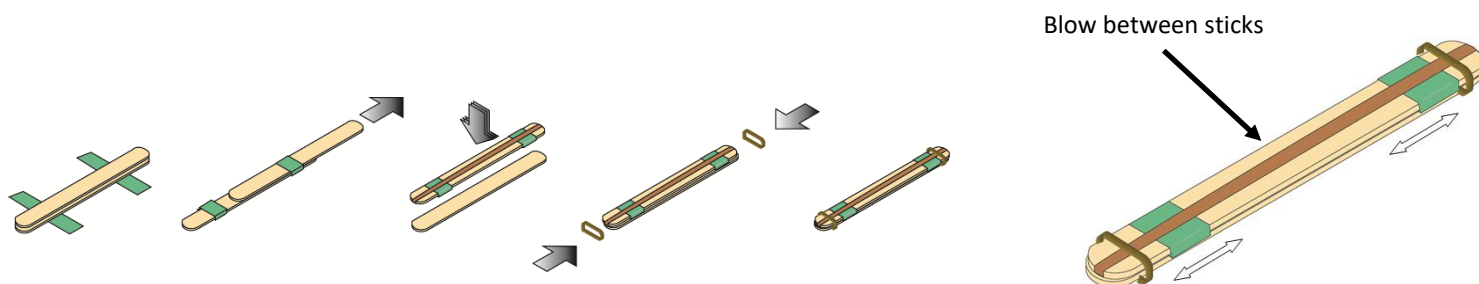
Use the following items to assemble each project:

- Craft sticks, jumbo (2)
- Cardstock strips (2)
- Rubber bands, small (2)
- Rubber band, large (1)

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

## To Do and Notice

- 1** Stack the jumbo craft sticks together. Wrap a cardstock strip around one end of the stack and secure cardstock ends 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 removed craft stick from step 2 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.
- 6** Hold the harmonica by the paper sliders. Tuck in your lips over your teeth and lightly press the side of the harmonica onto the lips. Blow into the gap between the craft sticks and note the sound produced.
- 7** Blow with different relative strengths and compare the new sounds with the previous sounds.
- 8** 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.
- 9** **Share** student learning with RAFT! Submit photos/video via email at [education@raft.net](mailto:education@raft.net) or on social media ([Facebook](#), [Twitter](#), [Instagram](#)).



## Core Content Skills:

### Science & Engineering (NGSS)

Developing and Using Models, Planning and Conducting Investigations, Generating and Comparing Design Solutions, Properties of Waves, Definitions of Energy

### Social Emotional Learning

- Self-awareness
- Self-management
- Responsible decision-making

# The Content Behind the Activity

Sound is caused by **vibrations** that travel in the form of **waves** through a medium such as air or water and into the ear. The pitch (**frequency**) of a sound wave produced with using the RAFT Tongue Depressor Harmonica is equal to the number of times the rubber band vibrates per second (**hertz**). The frequency can be changed by moving the paper sliders various distances or by blowing air between the sticks with more force. In general, a shorter material length will vibrate more quickly (at higher frequency) than longer lengths.

Air flowing between the craft sticks causes the rubber band to vibrate (air turbulence). The rubber band has a **natural frequency** at which it vibrates most easily. The blown air moves the rubber band out of its rest position, storing energy in the material (**potential energy**). The stored potential energy gets converted into **kinetic energy** as the rubber band moves back towards and then past its rest position. This back and forth energy conversion continues if air is continually blown between the sticks, stretching the rubber band. It will eventually cease in the absence of blown air due to frictional forces within the rubber band. The range of the rubber band's movement away from its rest position can be reduced by slightly pressing the sticks closer together while blowing air between them, reducing the amount of potential energy stored in the material and thus resulting in a lower perceived sound.

## Reuse

This kit uses 100% reusable materials designed for other uses. To continue making a positive impact in reducing waste, reuse these materials in other projects. Additionally, any unused materials can be collected and delivered back to RAFT.

## Feedback

Please comment on this kit by taking this short survey: <http://bit.ly/RAFTkitsurvey>. Let us know of any material concerns (missing, broken, or poorly fitting parts) as well as any suggestions for improvement.

Visit <https://raft.net> to view related activities!

Buzz Off  
Cap Maracas  
Glove-A-Phone  
Making Waves  
Pan Pipes

## Resources

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