

EQUIPMENT BUILD PLAN SOUND & WAVES

Straw Flutes and Slide Trombones

A fat drinking straw with a pointed, flattened end makes a simple double-reed instrument. Cutting it shorter raises the pitch, adding straws lowers it, finger holes turn it into a playable flute, and a sliding inner straw makes a trombone. It is a quick, nearly free way to show how the length of a vibrating air column sets pitch.

Written from Bruce's original workshop handout. Bruce's final review of this plan is in progress.



DIFFICULTY	BUILD TIME
Beginner	5-15 minutes
COST	SAFETY
Under \$2	Everyday care
GOOD FOR	
Families, Teachers	

What it shows

Snip a drinking straw into a reed and it honks; snip it shorter and the note climbs; slide a second straw inside and it becomes a trombone.

Key ideas: vibration, pitch and frequency, resonance in an air column, wavelength and length

Safety (Everyday care). Each person should use their own straw. When cutting a straw shorter while someone plays it, cut only the far end, well away from the player's face. Young children should have a grown-up do the cutting.

CONSTRUCTION

Build it

Materials

- ☐ **Large-diameter drinking straws** · 3 or more per person
The fat straws from fast-food restaurants work best
- ☐ **Narrower straw that fits snugly inside the fat straw** · 1
For the slide trombone
- ☐ **Bell: top of a 2 liter bottle, a cut-off milk jug, or a cone of heavy paper** · 1
Optional, makes it louder

Tools

Scissors

Clear plastic tape

1

Flatten the end

Press one end of a fat straw flat for about an inch, using your fingernail or the edge of a table.



2

Cut the reed

Cut the flattened end into a point by snipping off each corner. These two flaps are the reed.



3

Close the reed

The points are usually too far apart. Bite gently on the flattened end with your back teeth to bend the flaps closer together, about 1/8 in apart.



4

Blow

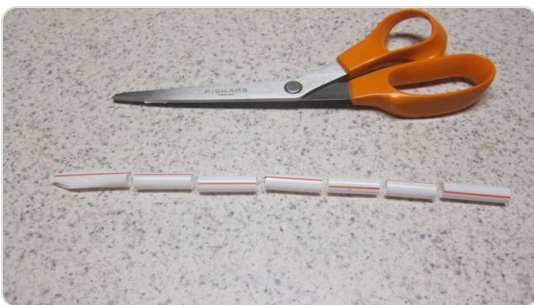
Put the reed end in your mouth past the cut, close your lips around it and blow firmly. A full-length fat straw usually sounds around middle C to D.



5

Raise the pitch

While someone plays, cut an inch off the far end. The note goes up. Keep cutting an inch at a time and the note keeps rising.



6

Lower the pitch

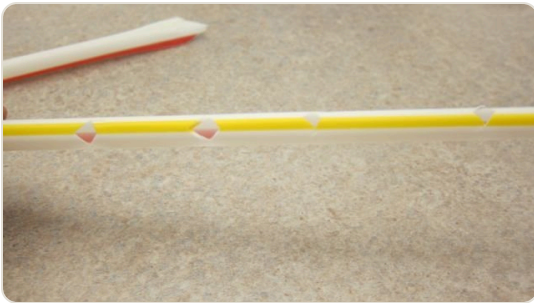
Cut a 1 in slit in the end of a second straw, squeeze it and slide it over the end of the first. The longer the instrument, the deeper the note. A third straw gives a low bass tone.



7

Make finger holes

To make a flute, pinch the straw slightly flat and snip a small V notch. When you pull out the plastic, it leaves a diamond-shaped hole. Experiment on one straw to find where holes give real notes, then copy the spacing onto a fresh straw. Cover a misplaced hole with tape.



8

Make a slide trombone

Make the reed on the fat straw, then slide the narrower straw into its open end. Pull the inner straw in and out while blowing to slide the pitch up and down. A tab of tape on the end makes a handle.



Add a bell

Fit the end of the straw into the neck of a cut-off 2 liter bottle top, a milk jug or a paper cone. The larger the bell, the louder the sound.



THE PHYSICS

How it works

Blowing through the flattened end makes the two plastic flaps vibrate, rapidly opening and closing like the double reed of an oboe or bassoon. Each opening lets in a puff of air.

The air inside the straw has a natural frequency at which it vibrates most easily, and that frequency controls the reed. The column of air resonates and sets the pitch you hear.

A longer column of air vibrates more slowly, giving a lower note; a shorter column vibrates faster, giving a higher note. Cutting the straw raises the pitch, and adding straws or pulling out the trombone slide lowers it.

An open finger hole lets the sound escape partway along the straw, so the air column acts as if it were shorter, and the pitch goes up. Uncovering more holes gives higher notes, just as on a real flute or clarinet.

Using it

- Cut the straw an inch at a time while a student plays, and have the class describe how the pitch changes.
- Measure straw lengths that give a scale, using a tuner app or a piano, and tune a set of straws.
- Challenge students to tune a three-hole straw flute and play a simple song.
- Compare the sound with and without a bell and discuss why the bell is louder.
- Bring in real instruments (oboe, clarinet, trombone) and compare how they change pitch.

GO FURTHER

Variations

- Panpipe-style set: a row of reed straws cut to different lengths, each giving one note.

- Bass straw: join three straws end to end for a very low tone.
- Bigger bells: a gallon milk jug or a large paper cone for more volume.

IF IT DOESN'T WORK

Troubleshooting

IF THIS HAPPENS

No sound, just air.

TRY THIS

The flaps are too far apart. Bite the reed flatter so the tips nearly touch, and put more of the reed in your mouth.

IF THIS HAPPENS

No sound and it's hard to blow.

TRY THIS

The flaps are pinched shut. Open them slightly with a fingernail, or cut a fresh reed.

IF THIS HAPPENS

Finger holes don't change the note much.

TRY THIS

Holes that are too small have little effect. Make them a bit larger, and seal any leaks with tape.

IF THIS HAPPENS

The trombone slide leaks.

TRY THIS

Choose an inner straw that fits more snugly, or wrap a layer of tape around it.