

Let's Get Loud

Grades 3-5

Email us to request FREE milkshake straws for this activity!
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The Big Idea

You'll use rubber bands to generate **different sounds**, then make a **pan flute** out of milkshake straws. Finally, you'll get to yell into a **decibel-meter** and find out how loud you are - using **math** the whole time to create **funky music!**

Supplies

- ★ Large cups: 1 per kid
- ★ Markers: 1 per kid
- ★ Masking tape
- ★ Measuring tape: 1
- ★ Milkshake straws: 8 per kid plus 8 for coach to make sample
- ★ Rubber bands: 1 per kid
- ★ Scissors: 1 per kid
- ★ **To print:** Straw Measuring Guide, 1 per kid plus 1 for coach

For bonus optional activity on page 5:

- ★ Free sound meter app for a smartphone or computer, like Decibel X

Key Prep

- ★ **Print 1 copy per kid** of the Straw Measuring Guide. Be sure to print in landscape orientation, not portrait!
- ★ **Make a pan flute** (page 3) to use as an example during the activity.

What's the Math?

- ★ Measuring length
- ★ Comparing and sequencing lengths
- ★ Simple relationships between variables

Kickoff

Intro to the kids: “Did you know no one can hear you yell in outer space? That’s because there’s no air! When we make sound, we’re actually rippling the air in waves. Today we’re going to test 2 math ideas about sound: the **pitch**, how high or low the sound is, and the **volume**, how loud it is.”

Rubber Band Band (10 minutes)

Intro to the kids: “The strings of a guitar or piano play different musical notes because they’re **pulled to different thicknesses**. We can see how this works with a rubber band.”

- ★ Give each kid 1 rubber band. Have them hook each end over their thumbs. You can demonstrate this to the kids.
- ★ Ask the kids to pull the rubber band taut and strum the top of the band with an index finger. Then continue to expand and relax the rubber band while strumming to explore the difference in sound.

Ask the kids:

- ★ “What happens to the sound? Why?” (Discuss. Kids should notice that the sound of the note is changing. When the band is pulled thin, it produces a **higher pitch** than when the band is relaxed and thicker.)
- ★ “In math, the way 2 or more things change with each other – like the pitch and the tautness of the rubberband - is called their **correlation**. When the temperature outside goes up, what goes down?” (Discuss. Answers include layers of clothing.)
- ★ “And what goes up?” (Discuss. Answers include thirst; eagerness to go swimming; air conditioner!)

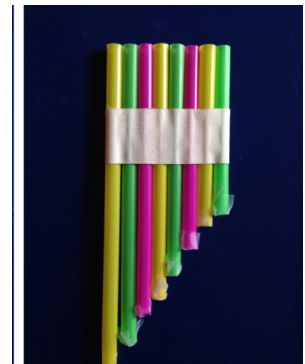
Be the Pied Piper (30-40 minutes)

Intro to the kids: “Now we’re going to use this idea to make our own pan flutes! With **instruments that use air to play**, like pipe organs, clarinets, horns or flutes, **pitch is determined by the length of the tube.**”

1. Hand each kid (or ask them to gather from a pile) **8 straws**, a copy of the Straw Measuring Guide, a marker, a cup and scissors. For kids who may not understand how a ruler works, **take a few minutes to review the Straw Measuring Guide.**
2. Have the kids mark 1 straw for each of the 8 lengths shown on the Straw Measuring Guide. Be sure the kids draw an X on the part of each straw **past the marking** to indicate the piece they’ll **discard.**
3. Then, kids **cut each straw at the line** they drew, and **put completed flute pieces into the cup** to keep track of them.
4. The kids test the sounds of their straws: they hold each straw with one end pointing **up** and **blow gently across the top.**

Ask the kids:

- ★ “How does the sound change when you cover one end with your finger?” (Answer: it drops by 1 octave!)
5. Give each kid a length of masking tape and ask them to tape over the ends of the straws where they made cuts.
 6. Then, kids put the straws **in order of length** from longest to shortest, with the longest on the **left.** The **open ends** should all be lined up top.
 7. Help kids **tape across and around the straws** to hold them together. Ask the kids to write their names across the band of tape on one side.
 8. Now kids **blow across the top** to make music!



Bonus (optional): If you have a tuned instrument handy (guitar, keyboard, smartphone app), you can use that to **identify the notes the kids’ pan flutes play** and then write the notes on the other side of the tape.

A Touch of Class: “Did you ever realize there was so much math in instruments? It’s just like the math you see in class when your teacher asks you to measure and compare lengths so you can put them in size order.”

Bonus, if you have time: Be Loud (10 minutes)

Intro to the kids: “Did you know that you can use numbers to measure noise? Sound is measured in **decibels**. Let’s use a sound meter to find out how loud YOU are!”

1. Use masking tape to make a start line on the floor at one end of the room. Place a second line of tape about 15 feet away.
2. Divide the kids into 2 teams and put 1 team at each tape line.
3. Open the suggested free sound meter app and stand with 1 of the teams while holding the meter.
4. Ask the opposing team to start reciting the alphabet while your team watches the meter and records the decibel level.
5. Switch the meter to the other team and repeat. Compare readings to see who talked louder!
6. Next, gather both teams at the same line. Stand with the kids while holding the meter.
7. Ask 1 volunteer to stand at the other end and start reciting the alphabet while walking toward the meter.



Ask the kids:

- ★ “What happened to the decibel reading as talker got closer?”
- ★ “Unlike an inch which is always the same amount, **decibels change with distance:** they drop as you stand farther from the noise, and rise as you stand closer.”
- ★ Cool fact: when you go up 10 decibels, you **double** the loudness of a sound.