List of Supplies:

1. Scissors
2. Electrical tape (enough rolls to pass around)
3. Masking tape
4. PVC (cut

Abel's Advice:

- ½ inch PVC $4 for ten feet home depot
- Place where they can cut in Home Depot
- Gloves, adult large, cutting off fingers and cut a small hole at the fingertip
- Straws too
- Latex will work, don't use the food service one

- At least four wraps, a little bit more, can't do too much or too little
- Needs to be electrical tape, harbor freight or Amazon
- Has to be flat to flat

Supplies purchasing:
Harbor freight: electrical tape, rubber bands
Home Depot: PVC
Dollar Store: straws, clothespins
.5" inch wide, 2.5" inch long rubber bands

Day-of Prep:

- Scissors for the volunteers (to cut electrical tape)
- Pens for Photo Release and Feedback papers

Resources:

https://www.theschoolrun.com/what-is-sound

Random Points to Cover (before I forget)

- Ripple effect with dominoes demonstration
- ~~Use of cans, slinky, and rubber bands to demonstrate the vibration~~
    - ~~Something smaller? They can take it home with them?~~
        - ~~Tissue boxes (too big), toilet paper rolls (too weak?), tin-cans (too sharp?)~~
- Piano tuning fork
    - Hitting it causes it to vibrate, causes sound to move particles all the way to your ear
- Put hand on throat, feel vibrations when they talk

Key Points to Remember during the activity itself:

- **Wait to let kids figure it out on their own**
    - **Then, if stuck, go in and help**
- **If one person is done, ask them to go around and help everybody else**

Reminders:

1. Photo Consent
2. Feedback papers
3. Take attendance

Intro to Valley STEM - Cyrus

1. Who we are, what we do

Intro to Activity -Ellery

1. Before we begin to talk about how instruments make sound, and how that sound gets from place to place, we're all going to try something real quick.
    a. (everybody puts their hands to their throats, hums
        i. **ASK:** What did you guys notice when you hummed?
            1. accept/listen to responses
        ii. **ASK:** What did you feel in in your hands (if they haven't already gotten there)
        iii. As some of you guys pointed out, when you all hummed, your throat vibrated.
            1. This is what we're going to be learning about today!
                a. We're going to be learning about how every single sound in the entire world is because of vibrations
    b. Piano Tuner, ask for two volunteers, come up and have us test it out
        i. demonstrate up front, pass around
        ii. See how when you hit the tuning fork, it creates a noise?
            1. **ASK:** Did you guys also notice how the two prongs are vibrating?
2. **Ask:** How many have played or play an instrument? What instruments do they play?
    a. Explain how all of these instruments, in some way, work because of vibrations, whether it's a string, a drum, or a reed
3. "Today, we're going to be teaching you guys why exactly vibrations create sound!
    a. Start off by making our very own harmonica!"

Harmonica Activity Procedure -Justin

1. Before we tell you guys how do vibrations work, you guys are going to be able to see it for yourself by making your very own Harmonica!

    a. Make sure they know what a harmonica is
2. Volunteers pass out electrical tape and one half of clothespin (explain to parents that it's just a clothe's pin disassembled, and we did it to save the kids some trouble or something)
    a. Wrap the electrical tape completely around the end of the harmonica, one strip of tape on each end.
3. Volunteers pass around the other half of the clothespin, and the rubber band
    a. Wrap the rubber band around the second half
4. Pass out more, small strips of electrical tape
    a. Now, take both ends of the clothespin, and tape them together
        i. MAKE MAKE MAKE sure that when they tape them down, they have the flat side to the flat side
5. Once you guys have taped them down, blow really hard into the center of the two pieces
    a. Demonstration up at the front of the room
6. Tell everyone to quiet down, listen
    a. When you blow into the two pieces of wood, the rubber band inside vibrates.
        i. May have done this before with a blade of grass
    b. We're going to explain how this works, by first explaining things called "air particles"

Air Particles Explanation -Cyrus

1. Everything in the universe is made of really really small things called ~~particles~~ molecules.
    a. **Molecules** are like tiny building blocks, that everything in the universe is made out of
        i. **ASK**: What are the three states of matter?
        ii. For example, pizza a solid, soda, a liquid, and air, a gas are all made out of particles
            a. The particles for each of the different states of matter are spaced apart different.
        iii. Particles in a solid are very tightly packed, there's no room for them to move around
        iv. In a liquid they move around, but they always group together
        v. In a gas, they are spaced far apart, and therefore have plenty of space to move around

Sound Waves -Justin

1. Tell everybody to look up at the front of the room
    a. To show how sound works, demonstrate with dominoes
    b. The dominoes represent air particles

i. When something vibrates, it causes the air particles to shake and move, bumping into the air particles next to it and causing them to do the same.
    1. This happens until the sound reaches its destination, whether it's your phone, a microphone, or someone else's ear
    2. Inside your ear is something called an ear drum, which picks up on the tiniest of vibrations, and send information to your brain about what you just heard

Activity Procedure -Justin

1. Now we're going to build another instrument that you guys can take home that demonstrates how vibrations make noise, and it's a lot of fun!
    a. First, our helpers are going to pass out pieces of tubing, a piece of a latex glove, and a strip of tape
        i. If you guys look, you'll notice that one of the holes is a lot larger than the other.
            1. Take the straw and put it in small hole of the glove finger
            2. Next, wrap the part where the glove meets the straw using the tape just like this (*tell them to look up at the front, see demonstration)*
                a. If you guys, and all you parents, want to look up at the front, you can see that all we've gone ahead and done is cut off one of the fingers from the latex gloves, and cut a very small hole at the tip of the finger.
            3. Now, our volunteers are going to pass out little pieces of straws, and another piece of tape
                a. Put the straw inside the smaller hole in the glove
                b. Take the piece of tape, and wrap it around the place where the glove overlaps the staw
    b. Explain how to use the instruments

Conclusion -Ellery

1. Explain the Fog Horn, and how it demonstrates that vibrations cause sound
    a. When you blow through the straw, the air makes the piece of plastic covering the pipe vibrate very quickly
        i. Just like the rubber band, it makes a noise
2. Breakdown of event

    a. **Ask** : what are the really, really small things that we talked about today? That are pretty much the building blocks for everything?
    b. **Ask:** What happens to these particles when something vibrates really, really quickly?
        i. Remember the dominoes, humming, piano tuner
3. Valley STEM conclusion
    a. That concludes our lesson for today! As Cyrus touched on briefly at the beginning of our lesson, we are from a student founded and run non-profit called Valley STEM
    b. Mission: spread a passion for science, technology, engineering, and math to kids all around Fresno
4. Feedback papers
    a. We're always trying to improve, so if have any feedback you'd like to give us we have forms up at the front.

Justin: Activity Procedure, Sound Waves
Ellery: Conclusion and intro to Activity
Cyrus: Intro to Valley STEM, Air Particles