TEACHER DEMONSTRATION

Making Salt Bounce with Your Voice

OVERVIEW

The teacher makes salt bounce using only his/her voice.

LEVEL 2

LEARNING OBJECTIVE

Students **see** the vibrations that are created by sound and by your voice.

Why It's Easy for You

- You do the demo
- An elegant demonstration of concepts
- Materials are inexpensive
- Scripts are included where appropriate (indicated by the purple dots.)

Conditions and Challenges

- You need multiple materials
- The "device" can be tricky to make
- You need a document camera

Materials

- Condiment cup (like you put ketchup in at a fast food place) *Alternatives: a glass jar, baby food jar, dixie cup or other cup*
- Balloon
- Scissors
- Rubber Band
- Salt
- Bowl *(optional—keeps things cleaner)*
- Plastic Wrap *(optional)*

Summary

First you will make a "eardrum-like" device. The balloon will serve as a "membrane" pulled over the top of the condiment cup. You will then place salt on this device, and yell near it to make the salt bounce.

INSTRUCTIONS

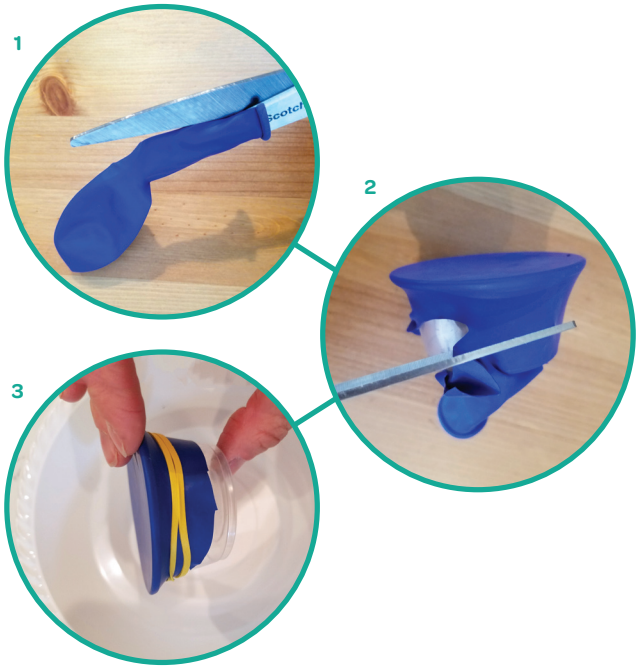
Making your device

1. Use scissors to cut along one side of the balloon, about 2/3 of the way to the top, as shown in the picture. **Leave enough of the balloon intact so that it can cover your cup.**

2. Stretch the balloon across the top of the condiment cup, as shown in the picture. The balloon should be taut and flat across the opening of the condiment cup.

3. Secure the balloon around the cup with a rubber band. Make sure the rubber band is the right size to keep the balloon secure.

4. Adjust the tightness of the balloon so that it's taut and flat across the top.



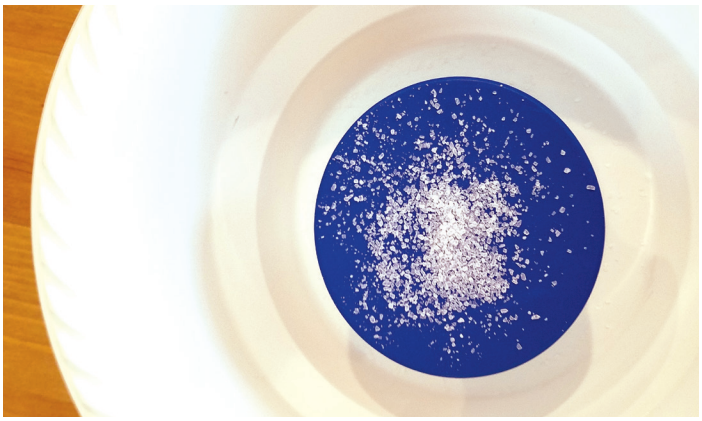
All About Sounds and Vibrations

Making Salt Bounce with Your Voice *continued*

Making the Salt Bounce

5. If you prefer to keep things tidy, place your device in a bowl.

6. Place the device in the bowl under the document camera, so the class can observe.



7. Sprinkle some salt on the balloon. You want enough salt that it is visible, but not so much that it weighs the balloon down (see image above).

8. Cup your hands around your mouth and "yell" directly towards the balloon membrane. We recommend a low, strong yell; try to mimick a fog horn.

9. What happened? You should see the salt bouncing.

Blowing Vs. Vibrating

10. Ask students "Do you think vibrating the salt with sound will look different than blowing on the salt?"

11. Gently blow on the salt.

Script A

Here I have a condiment cup, the type you might put ketchup into in a fast food restaurant. I stretched a balloon over this cup, you can see the balloon is held tight with a rubber band. This is a lot like a trampoline, or a drum. Or—your eardrum!

Script B

When I yelled, the sounds, or the vibrations, came out of my throat, traveled through the air, and *vibrated* the balloon. When the balloon vibrated, it made the salt bounce. I actually made something move using only my voice!

Script C

When I blew on the salt, all the salt moved in one direction. Basically I made *wind* that moved the salt. This is different than moving the salt with my voice.

When I moved the salt with my voice, I vibrated the balloon up and down (show with hands), so the salt also bounced up and down.

Making Salt Bounce with Your Voice *continued*

Sound Moving Through Materials

Note: You need plastic wrap and bowl for this part.

12. Place the plastic wrap over the top of the bowl. Make sure the salt is still visible on the overhead projector.

13. "Yell" in a low, strong voice again at the salt/balloon device. The salt should bounce.

14. Test if you can *blow* the salt through the plastic wrap. The plastic wrap will block the wind.

Script D

Hold up a piece of plastic wrap.

Do you think that if I put this plastic wrap over the top of the bowl that I will still be able to make the salt move with my voice?

Can sound go through plastic wrap?

Let kids answer—there is often some disagreement on this. Don't tell them the answer yet!

Before I see if we can make the salt bounce through the plastic wrap, lets see if sound can travel through a door. What do you think? Can sound travel through the door?

Let the kids answer. Go outside and close the door. Yell through the door, give the kids a question they can answer. (e.g. "Can you hear me?"). Come back inside.

Did you hear me through the door? Since you could hear me through the door, did sound travel through the door?

Proceed with the following steps to provide the answer.

Suggested Script E

The plastic wrap blocked the *wind* but not the *sound*. That is because the sound actually vibrated the plastic wrap! The sound and vibrations traveled through the plastic and vibrated the balloon to make the salt bounce. When I blew on the plastic however, I created wind. The plastic blocked the wind.

All About Sounds and Vibrations

Making Salt Bounce with Your Voice *continued*

HANDS-ON STUDENT ACTIVITY

Feeling ambitious? Make a bunch of these devices and let the kids try them out! You might be worried about the children yelling, but we have done this activity successfully in dozens of classrooms. With the right preparation, the children behave nicely. When it gets too noisy, we simply end the activity.

Materials for Each Pair of Children

- One balloon/cup device
- One bowl
- One small container of salt (we use condiment cups)

Note: Remind students they are not to eat the salt.

Instructions for Children

1. Instruct the students to be ***gentle*** with the balloon device. They can ***gently*** tap their finger to make a drum sound. They may ***not*** press roughly on the balloon, or dig their fingers into the balloon.
2. The students should yell, not scream. The difference is that screaming is what they might do if they are in danger. Students are instructed to make a *low* yell with their hands cupped toward the bowl. If they get too loud, the activity will stop.
4. Students are to place the bowl between the two partners and take turns making the salt bounce by yelling.
5. Students may compare yelling and blowing but they should blow gently, otherwise they may end up with salt in their eyes.
6. Remind students they are to stop the yelling as *soon* as the teacher instructs them to stop.
7. When blowing the salt, students should blow ***gently*** to avoid getting salt in their eyes.

ADDITIONAL NOTES

Tips for the Activity Running Smoothly

We have found that students will generally follow these instructions, however, it is easy for them to forget and start to get too loud. A kind but firm correction usually does the trick.

- After a certain number of minutes, even the best behaved classrooms start to become rowdy. This means it's time to end the activity.
- Encourage students to discuss their observations with their partners.
- **Allow students to explore!** If they are frustrated help them do the activity "correctly" but let them try adding more salt or less, making different types of yells (as long as they are not screaming, etc.). They can go beyond the exact letter of the activity.

General Notes for the Demonstration

- When yelling at the salt, sometimes you'll see the salt making a pattern. This is due to the wave-like nature of sound.
- When using the device, sometimes a tight seal/vacuum is created and the balloon dips into the cup. If that happens, just let a little air into the cup.
- If you put a large amount of salt on the balloon it will be harder to vibrate the balloon for the same reason it would be harder to jump on a trampoline if the trampoline has big rocks on top of it. The weight of the salt will dampen the vibrations.