

ACTIVITIES (FULL INSTRUCTIONS)

Playact the Wave

Kids stand in a loose line and pump hands and forearms as human vibrations. A caller shouts **high!** / **low!** / **loud!** / **soft!** and the group adjusts: high = fast small pumps, low = slow pumps, loud = big sweeps, soft = small. Run a “song” of ~10 calls, then rotate callers so each child leads once. No materials.

The bump travels, not the stuff

Small scale: marbles lined touching in the grooved molding; each child shoots one marble in — the shooter stops dead, the far marble rolls off. Big scale: two kids stretch the slinky down the hall and send one push-pulse; the WAVE travels while every coil only jiggles in place. Say both times: *only the bump moves; the stuff stays put* — exactly how sound crosses the room.

Play It, Then Silence It — the payoff move

Any household instrument works: piano, guitar, drum, triangle, saucepan lid. SEE the vibration first — pluck or strike and watch through the pocket magnifiers (B-2 kit): the string visibly blurs, the drumhead shivers; on a piano, hold the key down and watch the string inside. Then STOP it: while the note still rings, the child lays a flat palm or finger on the wiggling part — instant silence. Each child makes a sound and kills it and says what they did. Close with: did you stop the SOUND or stop the MOVEMENT? Let them find that it is one act.

Sympathetic strings

Two strings tuned to the same note (guitar strings or two boxed rubber bands, pre-tuned in prep). A child plucks one, damps it — the untouched one keeps singing. Sound energy crossed the air gap and set matter moving: **sound is energy**. Let every child take a pluck-and-damp turn.

CLOSING Q&A (WITH THINK TIME)

- Why do you SEE lightning before you HEAR thunder? (Light travels almost instantly; sound’s bumps take time — count the gap.)
- The sun is a roaring furnace — why can’t we hear it? (No particles between us: no path, no sound. A vacuum carries light, never sound.)
- Is sound its own form of energy, or a special kind of movement energy? (Let them argue; the book’s answer: a travelling vibration — movement energy in wave form.)

SAFETY (FROM THE BOOK, SAY IT BEFORE THE PLUCK LAB)

A tightly stretched rubber band can snap and whip out. **Never hold a stretched band closer than about a foot from anyone’s eyes.** Tuning forks are struck on a KNEE — never on the table edge, never on another child.

REVIEW HOOKS

- Any sound that catches a child’s attention this week: “*what is vibrating?*” (the book’s To-Parents coaching, verbatim in spirit).

- Bath-time: hum with lips in and out of the water — which carries the buzz better?
- Science notebooks: draw one thing that made sound today and circle its wiggler.

PREP-AHEAD CHECKLIST (NIGHT BEFORE)

☐ stretch plastic-wrap drums over two bowls, test with the forks ☐ dye and dry the grains (couscous/rice + food colouring) ☐ tune two strings/bands to the same note and verify the sympathetic effect ☐ set the grooved molding level, marbles staged ☐ cut telephone strings to length, pre-punch the cups ☐ rubber-band assortment (C-1 kit) + open boxes + the recording grids ☐ pocket magnifiers (B-2 kit) in the instrument basket

Opening Oration — The Wiggle You Can Hear

read aloud, 2–3 minutes • the pluck box sits on your lap the whole time

PROP: a large rubber band stretched over an open box. Pluck it at the marked moments — let it ring each time before you speak on.

“Close your eyes for a moment and just listen.” (*pause — let the room's small sounds surface*) “Everything you just heard — the house creaking, a bird, your own breath — every single sound in your whole life has started exactly the same way. Something, somewhere, was **wiggling**.”

(*pluck*) “Look fast! See the blur? That string is swinging back and forth hundreds of times every second — too fast for your eyes, but not too fast for your ears. That wiggle has a name: **vibration**. And here is the rule with no exceptions anywhere in the universe: **no vibration, no sound**.”

“Touch your throat — gently — and say your own name.” (*do it with them*) “Did you feel it? You have strings too. Every word you have ever spoken was your own strings wiggling.”

“But how does a wiggle way over here...” (*pluck*) “...reach your ear way over there? It bumps. The wiggling string bumps the air beside it, that air bumps the next air, and the next, like a line of marbles — the air stays where it is, only the **bump** travels. And when the last bump arrives at your head, it finds a tiny drum stretched inside your ear, thinner than paper — your **eardrum** — and it plays it. Your ear is a drum, and the air is the drummer.”

“Today you are going to see vibrations, feel them, make grains of rice dance with them — and here is the strangest power of all: today you will learn to **kill a sound with one finger**. Because if every sound is a wiggle... what happens if you stop the wiggle?” (*pluck once more — then flatten your palm on the band, hard silence*) “Exactly that. Let’s begin.”

C-2 Supply List — Sound, Vibrations, and Energy

Everything for the full 9:30–2 day; prices rough. Only the slinky and molding ship.

ALREADY HAVE (TYPICAL HOUSEHOLD / PRIOR KITS)

☐	ITEM	USED IN
☐	Rubber-band assortment (C-1 kit — do not re-buy)	Pluck lab, oration prop, sympathetic bands
☐	Tuning fork set (owned)	Grain drum — the anchor
☐	Pocket magnifiers (B-2 kit)	Play It, Then Silence It — SEE the blur
☐	Any household instrument (piano/guitar/drum/lid)	Play It, Then Silence It; sympathetic strings
☐	Plastic wrap + two bowls	The grain drums
☐	Dry couscous or rice + food colouring	The dancing grains (dye in prep)
☐	Open boxes (shoe/tissue)	Pluck lab bodies
☐	A table + open floor + a hallway	Ear-on-table, Playact the Wave, slinky run

TO BUY

☐	ITEM	QTY	~PRICE	WHY	ORDER AHEAD?
☐	Metal slinky	1	\$8	The wave made watchable — the pulse travels, the coils stay	YES — ships
☐	Grooved wood molding, ~6 ft	1	\$6	The marble-chain particle model on the table	YES — ships (or hardware store)
☐	Bag of marbles	1	\$4	The bumps; REUSED in C-3's ramp rolls	with the molding
☐	Paper cups + kite string	—	\$5	The telephones — taut vs slack	No

Total new spend: ~\$23 — the marbles carry forward to C-3.

Tick the box beside each item as it goes in the box. Anything flagged **order ahead** ships — buy it a week before the lesson.

The Pluck Lab

KIDS HANDS-ON + RECORD

RUN AT 9:55

30 MIN

The point

Pitch obeys rules you can find yourself: **thinner** and **tighter** both make the wiggle faster and the note **HIGHER**. Change one thing at a time and the rules appear.

Materials

- Rubber-band assortment (C-1 kit) — thick and thin
- One open box per child
- The worksheet 2×2 grid + a pencil
- Strong light, dark background behind the band

Steps

- 1 **SAFETY first, out loud:** a stretched band can snap and whip — never hold one closer than a foot from anyone's eyes.
- 2 Stretch ONE thick band over the box, fairly loose. PREDICT high or low — then pluck. Circle it in the grid.
- 3 Same thick band, pulled TIGHT. Predict, pluck, circle. (Only the stretch changed!)
- 4 Swap to a THIN band: loose, then tight. Predict, pluck, circle each.
- 5 Read the finished grid: which corner is highest of all? (thin + tight)
- 6 Last: pluck once and just WATCH the blur shrink as the note fades — quieter and quieter, but does the pitch drop?

Say: “You just found a law of music: make the wiggle faster — thinner, tighter — and the note climbs. Every guitar and piano is built on the rule you found with a rubber band.”



TEACHER PREP

Sort thick/thin bands into two cups. Set a dark cloth behind the pluck station so the blur reads. Grids and pencils ready.

What to watch for

- Kids who change BOTH things at once — stop and redo: one change per pluck is the whole method
- The fading-note observation: amplitude dies, pitch holds

EXPECTED RESULT

The grid fills: loose-thick lowest, tight-thin highest. The blur narrows as loudness fades while pitch stays put — frequency and amplitude are different dials.

The Grain Drum

KIDS HANDS-ON

RUN AT 10:40

25 MIN

The point

A sound you can barely see makes matter **move** — grains leap and dance on the drum. Moving matter takes energy, so **sound is energy**. Field-proven anchor: every child strikes.

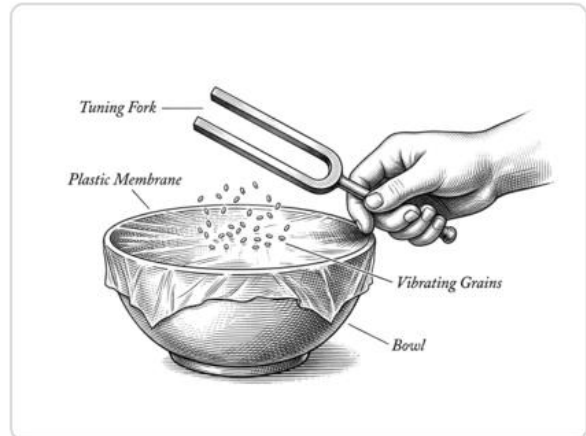
Materials

- Tuning fork set (owned)
- Plastic-wrap drum stretched over a bowl
- Coloured grains (dyed couscous/rice) in a cup
- A glass of water for the splash test

Steps

- 1 Sprinkle a spoonful of grains on the taut drum.
- 2 **PREDICT on the worksheet:** when the singing fork touches the drum edge, the grains will... sit still / jump and dance.
- 3 Each child in turn: strike the fork **on your knee** (never the table, never a person), hold it to your ear — hear it sing.
- 4 Dip the singing fork tips into the water glass — watch the splash! The wiggle is real and strong.
- 5 Strike again and touch the fork's base to the drum edge: the grains leap. Circle what happened.

Say: "The fork whispered — and the rice DANCED. Sound pushed matter around, and only energy can do that. Sound is energy on the move."



TEACHER PREP

Stretch and tape the wrap drums the night before; test that a struck fork makes the grains jump. Dye grains ahead and dry them fully.

What to watch for

- The water-splash moment sells the invisible wiggle before the drum does
- Every child gets a strike — the turn IS the lesson
- Knee-strike rule enforced every turn

EXPECTED RESULT

Grains dance on contact, every time, for every child. The predict box is settled by evidence and the sentence "sound is energy" belongs to the kids now.

The String Telephone

KIDS BUILD + TEST

RUN AT 11:35

25 MIN

The point

Sound needs a **path of matter**. A taut string carries the bumps beautifully; a slack string is no path at all — the call goes dead.

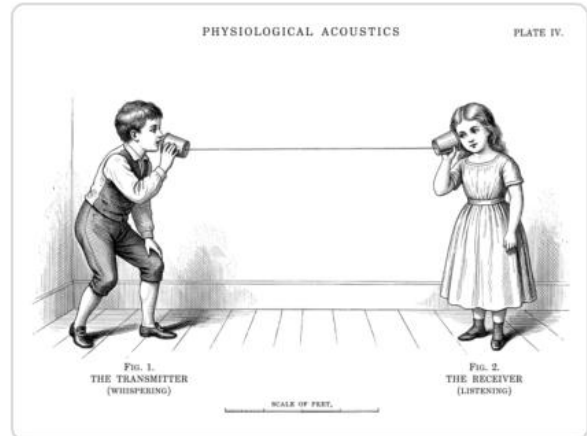
Materials

- Two paper cups per pair, pre-punched
- Kite string, ~10 ft per pair
- A doorway or hall to stretch across

Steps

- 1 Build: thread the string through both cups, knot inside each.
- 2 Pull the line **TAUT** across the room. One whispers into a cup, partner listens on the other. **PREDICT** first (worksheet box), then test.
- 3 Swap roles. Try a secret word — can the listener repeat it?
- 4 Now let the string hang **SLACK**. **PREDICT** (second box), then whisper again.
- 5 Pinch the taut string mid-call with two fingers — what happens, and why?

Say: "Tight string: the bumps march right down it, cup to cup. Loose string: no road for the bumps — your whisper has no way to travel. Matter must be pulled tight to carry sound."



TEACHER PREP

Pre-punch cup bottoms and cut strings to length. Scout a stretch long enough that normal voices won't carry over the air.

What to watch for

- The slack test is the teaching moment — run it **AFTER** the taut success
- The mid-string pinch: damping the path kills the call — C-2's silence move again

EXPECTED RESULT

Taut carries the whisper; slack goes dead; a pinch kills a live call. Sound travels only where connected matter can pass the bump along.



THE BIG IDEA

ALL sound comes from **vibration** — a fast back-and-forth wiggle. No exceptions. Fast wiggles sound **high**, slow wiggles sound **low**; big wiggles sound **loud**, small ones soft.

Sound travels the way a bump runs down a chain of marbles: each air particle bumps its neighbour and **only the bump moves on** — the air stays where it is. When the bumps reach your ear they play a tiny drum stretched inside it: your **eardrum**. And because sound can make other things move — grains dance, a second string sings — sound is **energy**.

Stop the wiggle and you stop the sound — the same act. No particles, no path: space is perfectly silent.

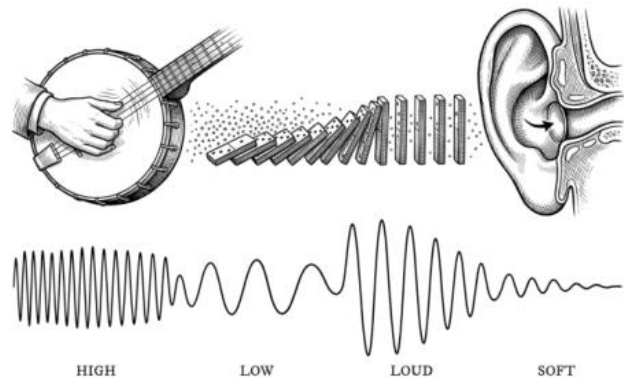


Fig. 1 — sound's whole trip: the pluck, the air passing the bump along like dominoes, the drum that catches it — and the wave's four moods: high, low, loud, soft

WORDS TO KNOW



vibration

a fast back-and-forth wiggle — where every sound begins



pitch

how high or low — how FAST the wiggle is



loudness

how BIG the wiggle is — it fades as the wiggle shrinks



eardrum

the tiny drum inside your ear that the air plays



vocal cords

the strings in your throat that wiggle when you speak

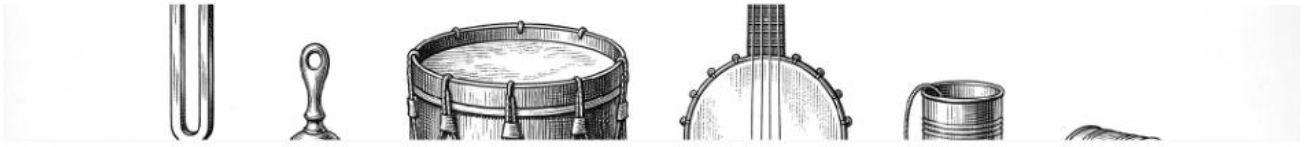


sound wave

the bump travelling on — the marbles stay, the bump moves

WATCH FOR THIS IN EVERYDAY LIFE

- Hum with a finger resting on your throat — “*feel the wiggle that IS your voice.*”
- Press an ear flat to the table while you tap it — “*why is it louder through the wood than through the air?*”
- Watch a guitar string or rubber band blur while it sings — “*when the blur stops, what else stops?*”



sound

sound

vibration

vibration

pitch

pitch



1 • THE PLUCK LAB — CIRCLE HIGH OR LOW IN EVERY BOX

One rubber band on the open box. Change ONE thing per pluck — never both. Circle what you hear. (Keep stretched bands a big step away from eyes.)

	LOOSE BAND	TIGHT BAND
THICK BAND	HIGH • LOW	HIGH • LOW
THIN BAND	HIGH • LOW	HIGH • LOW

Watch the blur as a note fades: the blur gets smaller (quieter) — but does the PITCH change? ☐ yes ☐ no

2 • GUESS FIRST, THEN CIRCLE WHAT REALLY HAPPENED

The grain drum

When the singing fork touches the drum, the grains will...

☐ sit still

☐ jump and dance

The telephone — taut

String pulled tight, my whisper will...

☐ reach the other cup

☐ stay silent

The telephone — slack

String hanging loose, my whisper will...

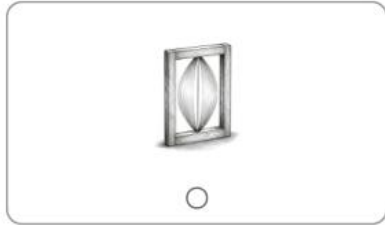
☐ still reach

☐ go dead

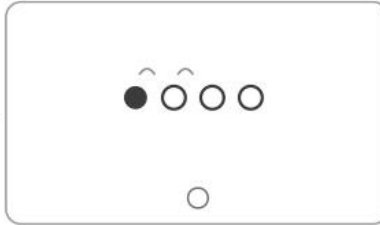


1 • LABEL SOUND'S JOURNEY — DRAW A LINE FROM EACH WORD TO ITS STOP

A grown-up reads the word bank. Draw a line from each word to the right picture.



☐ vibration



☐ air particles bumping



☐ eardrum

2 • DRAW ONE INSTRUMENT YOU PLAYED TODAY

Draw it big — then CIRCLE the part that vibrates. Tell a grown-up how you silenced it.

draw here — then circle the part that wiggles

No Vibration, No Sound

the lesson's song — sing it, then say what it means



SONG

VERSE 1

Pluck the string and watch it blur,
Touch it once — and it's gone, for sure.
Stopping the shake and stopping the ring
Are the very same thing.

CHORUS

Sound! Vibration! Pitch! Eardrum!
Something's shaking or there isn't any song.
Sound! Vibration! Pitch! Eardrum!
Shake it fast, shake it slow — sing along!

VERSE 2

Tight and short and thin go high,
Loose and long go low and shy.
That's the pitch, that's the pitch,
Faster shaking, higher pitch.

(CHORUS)**VERSE 3**

Bump, bump, bump goes marble to marble,
Only the bump goes down the line.
Press your ear to the table top —
It carries better than the air does. Fine!

VERSE 4

Way out in space where there's nothing at all,
A ringing bell would make no call.
No stuff to bump means nothing to hear —
And a little tight drum is waiting in your ear.

(CHORUS × 2)

Tag (spoken, kids): "Sound... vibration... pitch...
EARDRUM!"

How to use it. Play the recording once while everyone just listens. Play it again and join in on the chorus only — that is the part carrying the lesson. By the third time most children have the chorus. Then close the binder and ask what the words actually mean; a child who can sing it and explain it has the idea for good.