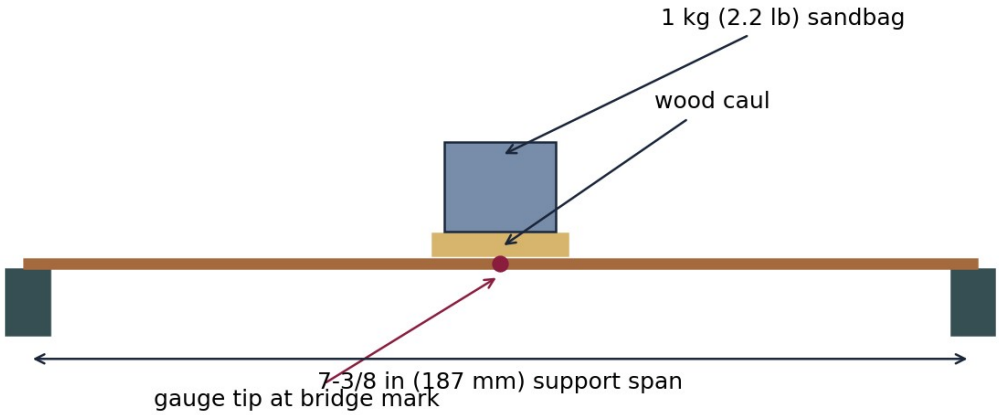
Tenor Uke Student Measurement Protocol

Deflection • Free-plate tap tone • Finished-instrument observations

Deflection setup — same span, load, and bridge position every time



Class rule: There are no pass/fail numbers in this guide. Compare your results only with the instructor's posted reference values.

Builder	
Instrument / serial	
Buddy	

1. What you are measuring and why

You will use two quick tests to learn how your top and back plates behave. The tests do not grade your wood. They give you repeatable numbers you can compare with the instructor's reference instrument and with your own plate at the next build stage.

- **Deflection** is how far the plate bends under a standard weight. A stiffer plate bends less.
- **Tap tone** is the musical note the plate rings when you tap it. A stiffer or lighter plate usually rings higher.

Measure each plate twice—before bracing and after bracing—then make three observations on the finished ukulele. Write every final result on the Build Specification Record so your instrument carries its own history.

2. Your buddy roles

Measurer	Checker
Does the hands-on setup, places the load, taps the plate, and reads results aloud.	Verifies every setup step, watches the gauge during loading, confirms the repeated spectrum peak, and initials the spec-sheet row.

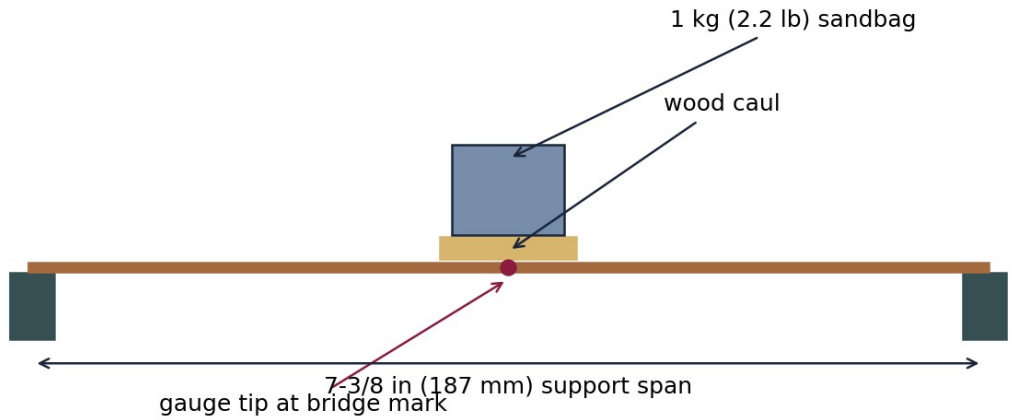
Swap roles at every new stage: unbraced top, braced top, unbraced back, braced back, and finished ukulele. By the end, both partners will know every job.

3. Before you start

- Plates are at final thickness for this build stage.
- Bridge position is marked lightly in pencil from the plan.
- Rig rails are clean; no chips or glue bumps are trapped underneath.
- Gauge probe is clean and moves freely.
- Phone is charged and TapTune for Luthiers (free tier) is installed.
- Room is quiet enough to hear a soft tap clearly.
- Build Specification Record and pencil are at hand.
- For a braced plate, the glue is fully cured. When in doubt, ask the instructor.

4. Part A — Deflection, step by step

Deflection setup — same span, load, and bridge position every time



1. Lay the plate outside-face down on the rails. Align your pencil bridge mark with the rig's centerline.

2. Checker: confirm the plate sits flat on both rails. Nothing should rock or hang off a rail.
3. Check that the gauge tip touches the underside of the plate at the bridge mark. Press ZERO.
4. Set the wood caul on the plate, centered over the bridge mark.
5. Gently place the 1 kg (2.2 lb) sandbag on the caul. Do not drop it.
6. Wait about 10 seconds, until the number stops moving. Measurer reads the value aloud; Checker confirms it.
7. Lift off the bag and caul. Confirm the gauge returns to zero. If it does not, re-seat the plate and start over.
8. Repeat twice more, for three readings total. Put the three readings in order and keep the middle value.
9. Write the middle value on your Build Specification Record. Use the Recording section of this guide.

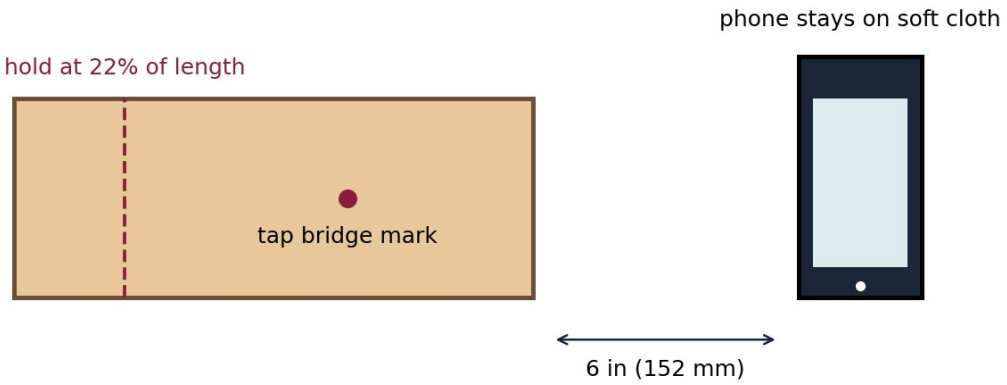
Do not rush the glue: Never measure a braced plate before the glue is fully cured.

Working readings — do not transfer until all three agree

Reading 1	Reading 2	Reading 3	Middle value
_____ in / _____ mm	_____ in / _____ mm	_____ in / _____ mm	_____ in / _____ mm

5. Part B — Tap tone of the free plate, step by step

Free-plate tap setup — five matching taps



1. Lay the phone on a soft cloth, microphone facing you, 6 in (152 mm) from where the plate will be. Use this same spot every time.
2. Pick up the plate. Hold it lightly between thumb and forefinger at one point 22% of the plate's length down from the neck-block end, near one long edge.
3. Tap the pencil bridge mark with your knuckle or a pencil eraser. Use medium taps in the same spot.
4. Take five taps. Watch the app's spectrum (the graph showing sound frequencies). Keep the strongest peak that appears in at least three of the five taps.
5. Use the Note-to-Hz Reference Table to find the nearest note. Write both the note and the measured Hz on your Build Specification Record.

Compare, do not grade: The instructor's reference values are posted in the shop. Your numbers should

be in the same neighborhood; there is no universal tenor-uke target in this guide.

6. Part C — The finished ukulele, step by step

1. Slip the foam strip under the strings at the soundhole to mute them. Without the foam, the phone may read string notes instead of body notes.
2. Lay the phone on a soft cloth with its microphone 6 in (152 mm) from the soundhole. Keep it in exactly the same position for all three observations.
3. Tap the bridge with a knuckle. This is the TOP resonance. Make five taps and keep the peak that repeats in at least three.
4. Tap the center of the back. This is the BACK resonance. Make five taps and keep the repeatable peak.
5. Tap the top right beside the soundhole with a soft fingertip thump. This is the AIR resonance. Make five taps and keep the repeatable peak.
6. Record all three as note and Hz. Also record the app name, microphone distance, room conditions, and today's date.

7. Recording — where each number goes

Every value from Parts A–C has exactly one matching field on the two-page Build Specification Record. Use the names below exactly; do not squeeze two results into one field.

Free plates: Optional Deflection and Tone Testing

Protocol result	Spec-sheet row	Named field	What to enter
Top, unbraced	Top — Unbraced	DEFLECTION	Middle gauge reading: in / mm
Top, unbraced	Top — Unbraced	TAP TONE	Nearest note / measured Hz
Top, braced	Top — Braced	DEFLECTION	Middle gauge reading: in / mm
Top, braced	Top — Braced	TAP TONE	Nearest note / measured Hz
Back, unbraced	Back — Unbraced	DEFLECTION	Middle gauge reading: in / mm
Back, unbraced	Back — Unbraced	TAP TONE	Nearest note / measured Hz
Back, braced	Back — Braced	DEFLECTION	Middle gauge reading: in / mm
Back, braced	Back — Braced	TAP TONE	Nearest note / measured Hz

- For each panel/stage row, enter in the conditions/method area: "1 kg (2.2 lb) load, 7-3/8 in (187 mm) support span, bridge position," plus your tapping method. Use the notes area for anything unusual.
- In CONDITIONS, record the support span, load, measurement point, room conditions, and tapping method. These are the details the sheet asks you to hold constant.
- In DATE / STAGE MEASUREMENT NOTES, record the date and stage. The Checker initials the completed row.

Finished ukulele: Optional Assembled-Instrument Observations

Protocol result	Named spec-sheet field	What to enter
Air tap	AIR RESONANCE · NOTE / HZ	Nearest note / measured Hz
Bridge tap	TOP RESONANCE · NOTE / HZ	Nearest note / measured Hz
Back-center tap	BACK RESONANCE · NOTE / HZ	Nearest note / measured Hz
Phone setup	TEST METHOD / MICROPHONE	"TapTune app, phone mic 6 in (152 mm) from soundhole, strings damped"

Protocol result	Named spec-sheet field	What to enter
Room	ROOM CONDITIONS	Short description, e.g., “quiet shop”
Date	TEST DATE	Today’s date

If a test was not performed: Write “N/A” exactly as the Build Specification Record instructs.

8. Sample results table

EXAMPLE ONLY — YOUR NUMBERS WILL DIFFER. These values show the recording format only. They are not targets or pass/fail limits.

Stage	Deflection (in / mm)	Tap tone (note / Hz)
Top — Unbraced	0.018 in / 0.46 mm	G4 / 392 Hz
Top — Braced	0.011 in / 0.28 mm	A4 / 440 Hz
Back — Unbraced	0.009 in / 0.23 mm	B4 / 494 Hz
Back — Braced	0.006 in / 0.15 mm	C5 / 523 Hz

Assembled-instrument example

Named field	Example entry
AIR RESONANCE	G3 / 196 Hz
TOP RESONANCE	A3 / 220 Hz
BACK RESONANCE	C4 / 262 Hz

These are format examples only—compare your real numbers with the instructor’s posted reference values.

9. Common mistakes to avoid

- Measuring a braced plate before the glue has fully cured.
- Changing the rail span, load, or tap spot between measurements.
- Forgetting to press ZERO before each deflection reading.
- Reading the gauge before it settles; wait the full 10 seconds.
- Working in a noisy room or holding the phone while tapping.
- Pinching the plate at its center or on an edge that kills the ring; use the 22% hold.
- Tapping a different spot each time; use the pencil bridge mark.
- Moving the phone between taps.
- Forgetting to damp the strings on the finished ukulele; you may record string pitches instead of body resonances.
- Comparing your results with anyone’s targets except the instructor’s posted reference values.

10. Buddy-check before every reading

Checker, point to each item and say “checked” before the Measurer begins:

- Plate is seated flat on both rails, with the bridge mark on the centerline.
- Gauge is zeroed.
- The 1 kg (2.2 lb) bag is the correct bag.
- Tap spot is marked.
- Phone is 6 in (152 mm) away and will stay untouched during taps.

- For the finished ukulele, the strings are damped.

When the stage is complete, the Checker initials the matching spec-sheet row.

Stop if it looks wrong: Ask the instructor. A weird number is data, not a mistake, until you know why.

11. Note-to-Hz reference table

Equal temperament, A4 = 440 Hz. Record the app's measured Hz, then choose the nearest note below.

Note	Hz	Note	Hz
G3	196.00	A3	220.00
B3	246.94	C4	261.63
D4	293.66	E4	329.63
F4	349.23	G4	392.00
A4	440.00	B4	493.88
C5	523.25	D5	587.33
E5	659.25	F5	698.46
G5	783.99	A5	880.00
B5	987.77	C6	1046.50

Final reminder: Consistency matters more than chasing a number. Same support, same load, same tap, same phone position—every time.