

## UNIT: UKULELE

# MODIFY & MEASURE

### OBJECTIVE:

Shape matters! You're going to test how different ukulele body shapes affect **loudness**, **vibration**, and **pitch** by comparing round, square, and triangle bodies.

### MATERIALS:

- ✓ 3 cardboard ukulele bases (each a different shape: round, square, triangle)
- ✓ Rubber bands (use the same size and thickness on all ukuleles)
- ✓ Stopwatch or phone timer
- ✓ Sound level meter app (optional) or just use your ears
- ✓ Ruler (optional)

### STUDENT DIRECTIONS:

#### STEP 1: Build or Prepare Your Ukuleles

- Make sure all three ukuleles have the same type of rubber band string.
- Only the shape of the body should be different:
  - One round, one square, and one triangle.

#### STEP 2: Test Each Ukulele Shape

- For each shape, do the following:
  - Pluck the string one time only (pull it back the same distance each time).
  - Time how long the string vibrates using a stopwatch.
  - Listen and give it a loudness rating from 1 (very soft) to 5 (very loud).
  - Describe the pitch (high, low, medium, etc.).

### STEP 3: Record Your Observations

Fill out the table below as you go:

Ukulele Shape	Loudness (1–5)	Vibration Time (sec)	Pitch Description
Round			
Square			
Triangle			

### REFLECTION QUESTIONS:

Which shape made the loudest sound?

→ \_\_\_\_\_

Why do you think that shape was the loudest?

→ \_\_\_\_\_

How do you think the shape affects sound energy or vibration?

→ \_\_\_\_\_

If you could invent your own shape for the loudest ukulele ever, what shape would it be and why?

→ \_\_\_\_\_

### STANDARDS ALIGNMENT

**NGSS:** 1-PS4-1, 4-PS3-4 **STEL:** STEL 1A, STEL 2C, STEL 7B, STEL 8B, STEL 9A **CCSS:** CCSS.MATH.CONTENT.1.MD.A.1, CCSS.MATH.CONTENT.4.MD.A.2, CCSS.MATH.PRACTICE.MP2, CCSS.MATH.PRACTICE.MP5, CCSS.MATH.PRACTICE.MP6