

FIT THE UKULELE

UNIT: UKULELE

OBJECTIVE:

Your goal is to figure out what size box would be needed to fit a ukulele inside it. You will convert units if necessary and use area to design a box that could realistically hold the instrument. No box will be given; you must imagine and calculate the correct box size.

MATERIALS:

- ✓ Ukulele
- ✓ Pencil
- ✓ Tape Measure
- ✓ Classroom Objects

ACTIVITY SETUP:

Students know how to use a tape measure to measure length, width, and height, and understand that a box can be modeled as a rectangular prism.

STUDENT CHALLENGE:

Imagine a box or container that you think the ukulele will fit in. Predict the measurements and prove your answer using math. If you can find a box or container in the classroom, that will fit the ukulele, you can use a tape measure to find the length, width, and height.

STUDENT DIRECTIONS:

1. Measure the Ukulele

Use the tables below to record your measurements and then ratio reasoning to convert between units.

Ukulele Part	Measurement (in)	Measurement (cm)
Length	_____ in	_____ cm
Width (at its widest part)	_____ in	_____ cm
Height	_____ in	_____ cm

Inches	Centimeters
1	2.54

2. **Find the volume of the ukelele in inches.** (Volume of a Rectangle = $L \times W \times H$)

The volume of the ukulele is _____ in^3 .

3. **Now convert the volume into centimeters.**

The volume of the ukelele in centimeters is _____ cm^3 .

4. Envision a Box or Measure the Box or Container you found in the classroom

Use the tables below to record your measurements and then ratio reasoning to convert between units. (Note: The box cannot match the exact dimensions of the ukulele. You must allow extra space for protective padding and packaging materials.)

Ukulele Part	Measurement (in)	Measurement (cm)
Length	_____ in	_____ cm
Width	_____ in	_____ cm
Height	_____ in	_____ cm

Inches	Centimeters
1	2.54

5. Draw the Box or Container

Draw the box or container as a rectangular prism and label its dimensions in inches using the information from the previous question.

6. Find the Volume of the Box

Find the volume of the box to confirm that the ukulele will indeed fit inside the chosen box. (Volume of a Rectangle = $L \times W \times H$)

The volume of my ukelele is _____ in^3 .

The volume of my box is _____ in^3 .

Decide whether your ukulele will fit inside the box and explain how you know. Use a comparison of the ukulele's dimensions and the box's dimensions to support your answer.

7. Draw the front view of the ukulele using rectangles

You will **approximate** the ukulele's front surface by breaking it into two rectangles using the dimensions from question 1. Be sure to **label each rectangle** with its length and width in inches.

8. Find the area of the ukulele's front surface

Once your drawing is labeled:

Find the area of each rectangle. Use the formula: (Length x Width)

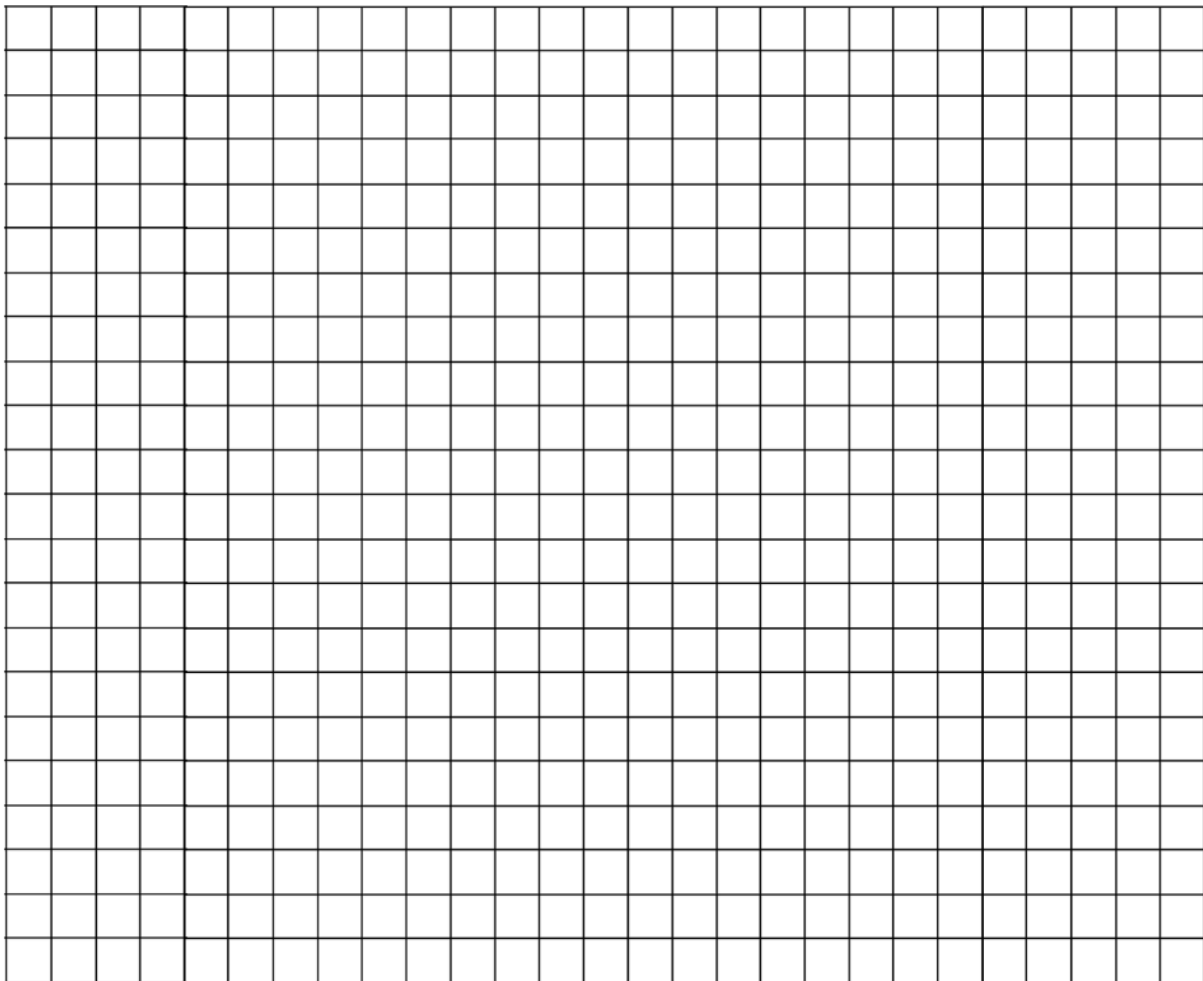
9. Add the two areas together

The approximate area of the ukelele's front surface is _____
in².

Decide whether it's an overestimate or underestimate and explain why.

10. Draw the Box or Container as a Rectangular Prism

Draw the box or container as a net of a rectangular prism and label its dimensions in inches (Can also use graph paper for this or provided grid)



11. Find the Surface Area of the Box

Using the drawing above, find the surface area of the box to find out how much material is needed to cover all sides of the box.

Total surface area of the box is _____ in².

Calculating Cardboard Costs

How much would your box cost to make if every square inch of cardboard cost \$0.03?

How much would it cost to make 5,000 of your cardboard boxes?

How much would it cost to make 10,000 of your cardboard boxes?