STATION 01 / EXHIBIT

FLAGS WORTH A CLOSER LOOK



Memorial Hall honors military service. Its historic flags need protection. Today you will measure paper copies of the Massachusetts flag.

1 Estimate the large print's area.

2 Measure both rectangles. Find their areas.

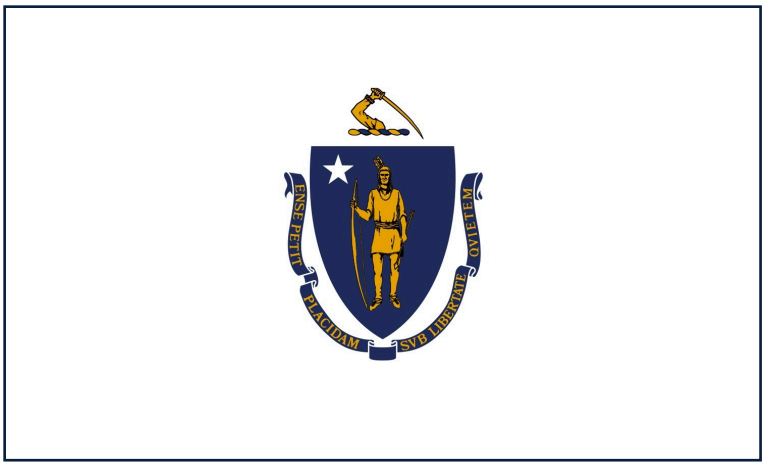
3 Compare the areas and explain the change.

PACKET PAGE 2 / MEASURING MAT 1 / 8 MINUTES

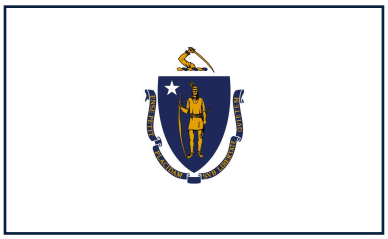
TWO MASSACHUSETTS FLAGS

Measure each complete white rectangle, from the middle of one outline to the middle of the opposite outline.

FLAG A



FLAG B



These are paper reproductions with the flag's 5:3 proportions. Your measurements describe the prints. Real flags come in different sizes.

Look closely: both the length and width change. What happens to the amount of paper inside the outline?

PRINT CHECK: this square must measure 1 cm × 1 cm.
Print at 100% / Actual Size. Turn off "Fit to page."

STATION 02 / EXHIBIT

THE GOVERNOR'S GAME



This is a real room in the governor's office. Governor Maura Healey was also a Harvard basketball co-captain and a professional player. Read her story on packet page 3.

1 Estimate and measure the court print.

2 Measure the rectangular basketball photo.

3 Compare the paper areas. Try the scale extra if ready.

PACKET PAGE 3 / MEASURING MAT 2 / 8 MINUTES

COURT & PHOTOGRAPH

Measure both printed rectangles. Round the court's sides to the nearest whole centimeter. Keep square-centimeter units.

COURT PRINT

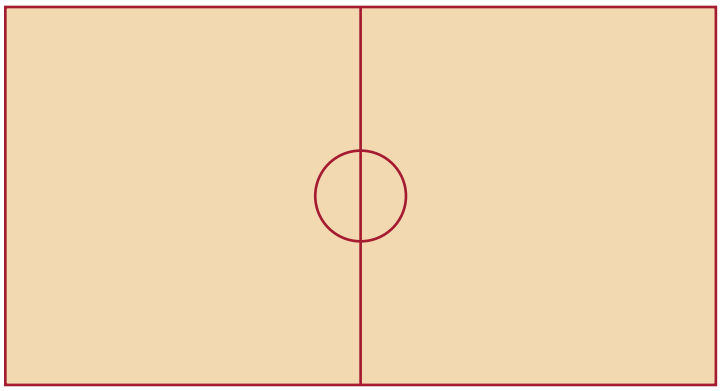


PHOTO PRINT



Which print covers more paper?
Compare the areas. The photo and the court drawing show different real things, so their paper sizes do not compare the real objects' sizes.

OPTIONAL SCALE CHALLENGE

The court uses 1 cm = 10 feet. One cm^2 stands for 10 × 10 = 100 ft^2. Multiply your estimated paper area by 100 to estimate the real court area.

NCAA court: 94 ft × 50 ft. Scale is preserved. Court markings are simplified.

PRINT CHECK: this square must measure 1 cm × 1 cm.
Print at 100% / Actual Size. Turn off "Fit to page."

THE DOCUMENT THAT GUIDES US



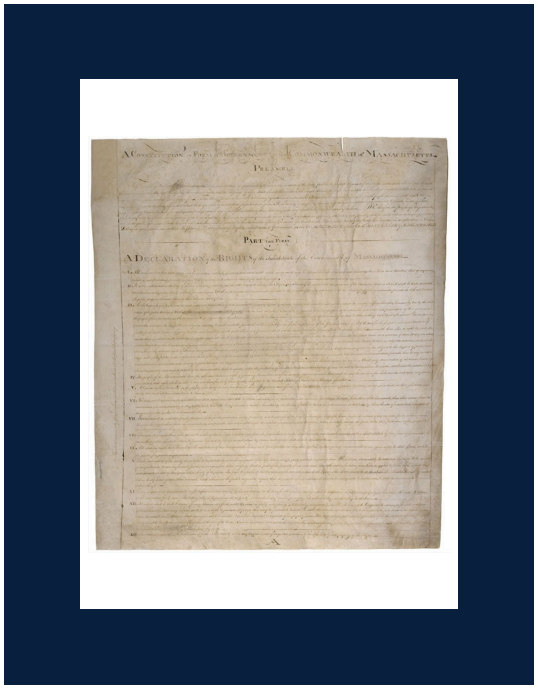
This House chamber mural shows John Adams, Samuel Adams, and James Bowdoin working on the Massachusetts Constitution. Adams was its main writer.

1. Measure the display mat and white window.
2. Find both areas. Subtract to find the blue border.
3. If finished, trace a classroom pen's footprint.

PACKET PAGE 4 / MEASURING MAT 3 / 8 MINUTES

THE CONSTITUTION DISPLAY

Find the blue area of this classroom display mat. Measure the outside and the white window. The old manuscript is a reproduction.



OUTSIDE RECTANGLE

Measure the full width and height of the blue mat.

WHITE WINDOW

Measure the full white opening, including the white space around the manuscript image.



JOHN ADAMS
Main writer of the 1780 Massachusetts Constitution. He later became the second president of the United States.

PRINT CHECK: this square must measure 1 cm × 1 cm.
Print at 100% / Actual Size. Turn off "Fit to page."

A FISH IN THE HOUSE



The Sacred Cod hangs above the House chamber. Its shape has fins, a tail, and curved edges. We will estimate the area of its flat photographic outline.

1 Find the area of the whole grid.

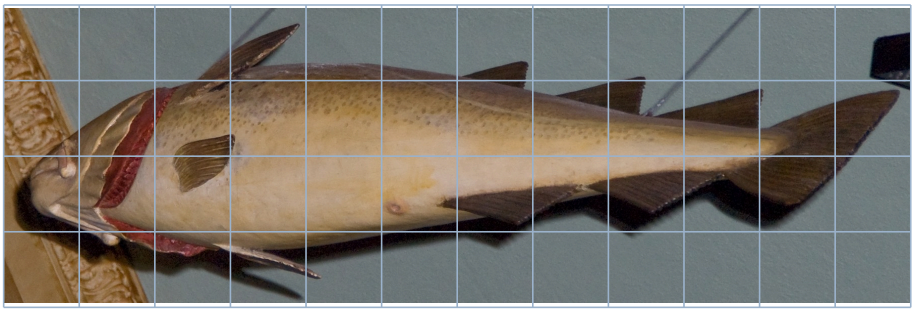
2 Count full squares inside the fish. Combine pieces.

3 Compare the fish's area with the grid's area.

PACKET PAGE 5 / MEASURING MAT 4 / 8 MINUTES

THE COD UNDER A GRID

Find the area of the whole grid. Then estimate how much of it the fish covers. Count fins and tail; leave out the shadow and wires.



EACH SQUARE = 1 cm^2

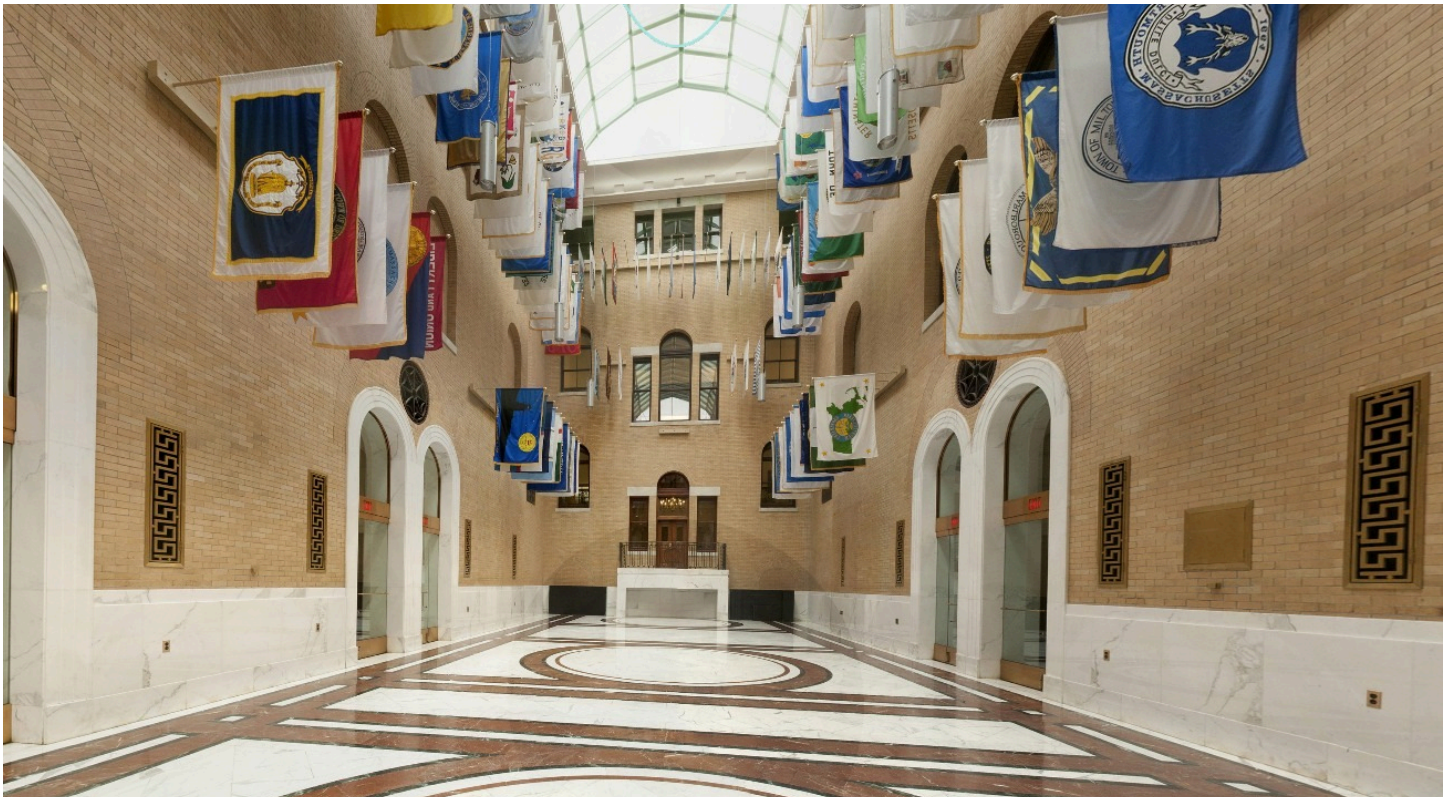
Try this counting method
Put a dot in each full square inside the fish. Pair small pieces along the edge until they make about one whole square.

Record your thinking on packet page 5. A careful estimate can differ from another group's estimate.

Dennis Wright photograph, CC BY 2.0. A grid is added for measurement. This is a flat silhouette, not the sculpture's curved surface area.

PRINT CHECK: this square must measure 1 cm × 1 cm.
Print at 100% / Actual Size. Turn off "Fit to page."

BLUEPRINT DETECTIVES



The Great Hall is one room on the official State House tour map. Find it at number 4. Your measurement job uses the outside outline of the building drawing.

1 Find the area of the whole grid.

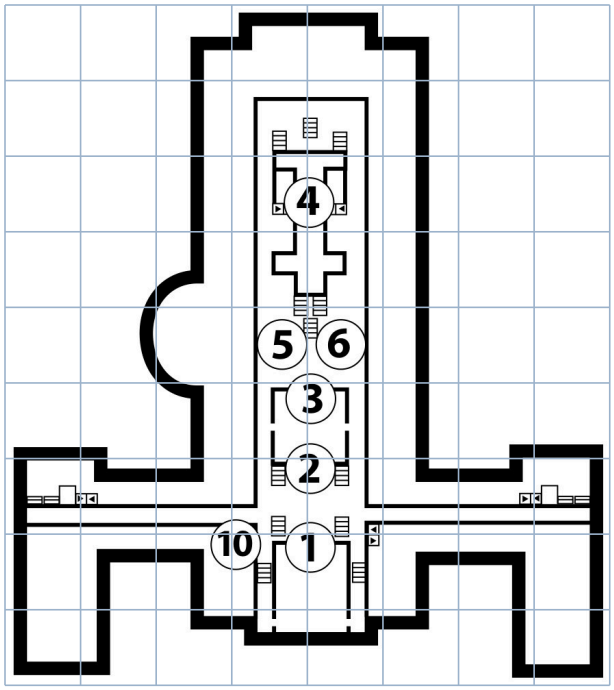
2 Count inside the building outline. Combine pieces.

3 Explain why the real floor area needs a scale.

PACKET PAGE 6 / MEASURING MAT 5 / 8 MINUTES

A BUILDING INSIDE A RECTANGLE

Start with the whole 8-by-9 grid. Then count the printed building's footprint. Include walls; ignore interior room lines.



EACH SQUARE = 1 cm²

Find these real places:
1: Doric Hall 3: Memorial Hall 4: Great Hall

The grid measures the print. The original tour map gives no real-world scale.

PRINT CHECK: this square must measure 1 cm × 1 cm.
Print at 100% / Actual Size. Turn off "Fit to page."

STATION X / ADVANCED ALTERNATIVE

A ROOM UNDER THE DOME



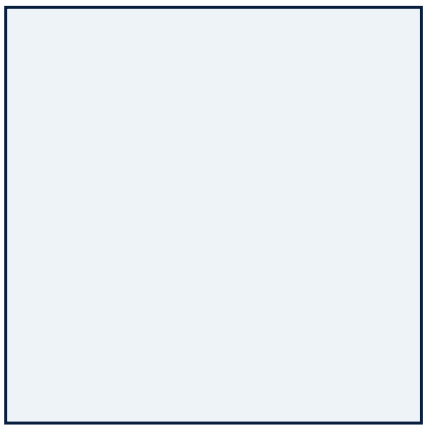
The Senate Chamber is directly below the gold dome. The official tour describes a 55-foot-square room. Your scale model will keep that square footprint.

1. Measure the model with decimal centimeters.
2. Find its base area, then its model volume.
3. Try the real-room area bonus if you finish.

PACKET PAGE 8 / MAT X / REPLACES STATION 5

THE SENATE CHAMBER MODEL

Scale: 1 cm = 10 feet. This square models the published 55 ft × 55 ft room footprint. Measure its side carefully.



MODEL BASE

Find the side length in centimeters, including the half centimeter.

Area = side × side

A CLASSROOM BOX MODEL

Use the square above as a base. Choose a model height of 2 cm.

Volume = base area × height

This chosen height is for the model only. It does not represent the real chamber's ceiling.



PRINT CHECK: this square must measure 1 cm × 1 cm.
Print at 100% / Actual Size. Turn off "Fit to page."