

Build and Compare Whole Bars

Construct scaled 100% bars, then interpret what their lengths mean.

HIGH SCHOOL • MA.912.DP.3.4

MA.912.DP.3.4 "Given a relative frequency table, construct and interpret a segmented bar graph."

NAME _____

DATE _____

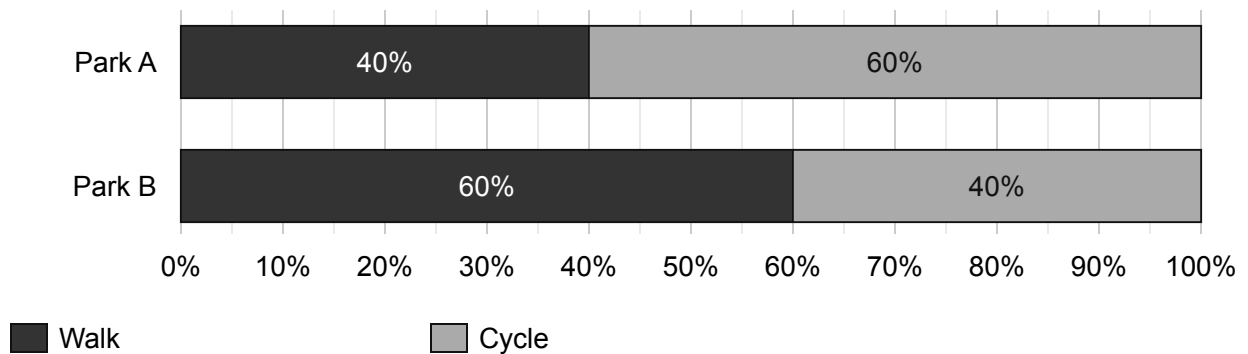
Name the denominator

A segmented bar represents one group's 100%, divided into categories. Put every bar on the same 0-100% scale; segment boundaries are cumulative percentages. If a table uses percentages of everyone, first divide each joint percentage by its row total to obtain within-group percentages.

Worked example

Read the two practice bars. Where is the first boundary in each bar, and what does the equal total length mean?

Practice choices within each park



1. Park A changes category at 40%; Park B changes at 60%.
2. Both bars end at 100% because each represents its own entire group.

Equal bar lengths do not establish equal numbers of park visitors.

All scenarios are simulated. Use the supplied 5% guides and 10% axis labels. For each graph, add a title, draw every internal boundary, and label or shade each segment to match the legend. Every bar must end at 100%. Tasks 1-5 use the gym table or your gym graph.

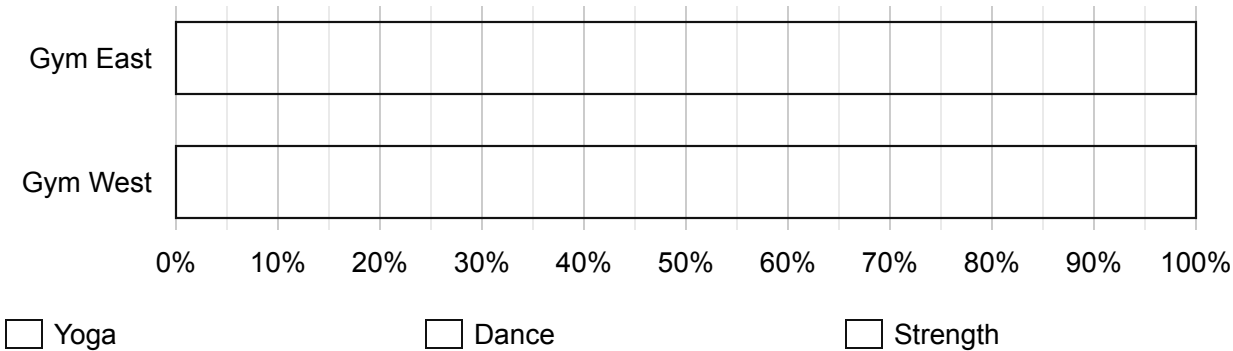
1. Construct from conditional percentages

Use the given relative-frequency table to construct two 100% segmented bars below. Keep Yoga, Dance, Strength in that order. Label each segment with its percentage.

Class choices within each gym (%)

Gym	Yoga	Dance	Strength	Total
Gym East	35%	40%	25%	100%
Gym West	50%	20%	30%	100%

Graph title: _____



2. Distinguish a width from an endpoint

On your Gym East bar, identify where the dance segment begins and ends. Explain why its endpoint is not the percentage choosing dance.

3. Compare the same category

Which gym has the larger share choosing yoga? Give both percentages and the difference in percentage points. Can that alone tell you which gym has more yoga participants?

4. Check a construction plan

A student draws Gym East boundaries at 0, 35, 40, 100%. Determine the category widths this actually creates. Explain why the plan does not represent the table and give the correct interior boundaries.

5. Combine unequal groups correctly

Gym East has 200 members and Gym West 100 members, with the exact class-choice percentages from task 1. Find the overall percentage choosing yoga. Explain why the simple average of 35% and 50% does not give the overall percentage.

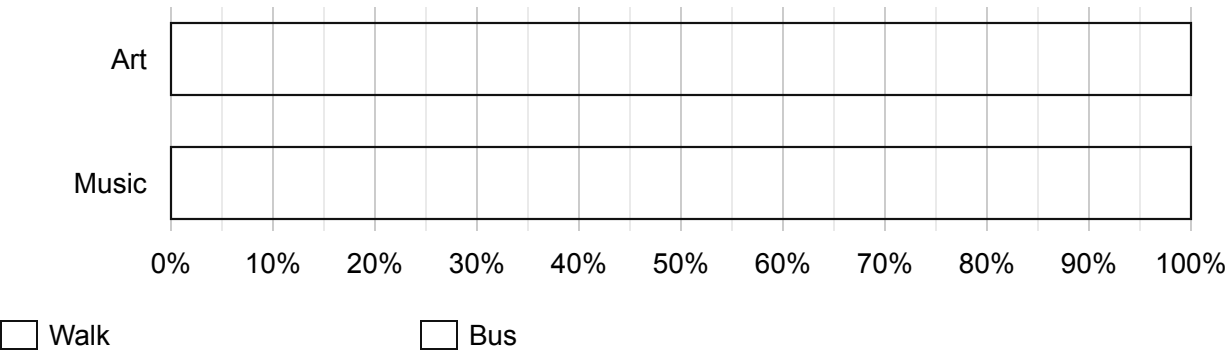
6. Convert the denominator before graphing

This separate table uses percentages of ALL respondents. Construct one 100% bar for each club's travel distribution. Show the two walking-rate calculations before marking the bars.

Club and travel (% of ALL respondents)

Club	Walk	Bus	Total
Art	30%	10%	40%
Music	15%	45%	60%
Total	45%	55%	100%

Graph title: _____



7. Infer a different group mix

A DIFFERENT club fair has 200 people: 40% walk overall. Within Art, 75% walk; within Music, 25% walk, as in your bars. Find the number in each club and each club's walking count. Show an equation or equivalent reasoning; do not reuse the earlier survey's group sizes.

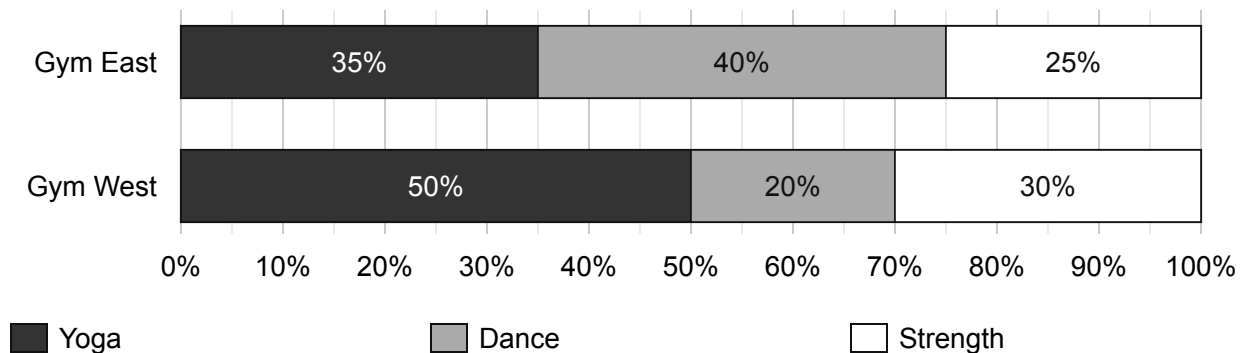
TEACHER NOTES

All scenarios are simulated classroom data. Accept equivalent exact fractions and percentages, but require the named denominator and an interpretation in context. Whole-sample relative-frequency tables have grand total 100%; row-conditional tables and each segmented bar instead represent 100% of their own group. Equal-length bars do not imply equal group sizes. Association does not establish causation. Keep solutions off student workspaces.

TASK 1

Gym East boundaries are 0, 35, 75, 100%; Gym West boundaries are 0, 50, 70, 100%. The complete graph shows category widths 35/40/25 and 50/20/30.

Class choices within each gym (%)

**TASK 2**

Dance begins at 35% and ends at 75%, so its width is $75\% - 35\% = 40\%$. The 75% endpoint includes yoga plus dance.

TASK 3

Gym West has 50% versus Gym East 35%, a 15 percentage-point difference. Counts cannot be compared without knowing the gyms' membership totals.

TASK 4

Those boundaries create widths 35%, 5%, 60%, not 35%, 40%, 25%. Correct interior boundaries are 35% and 75%; the second boundary is $35\% + 40\%$.

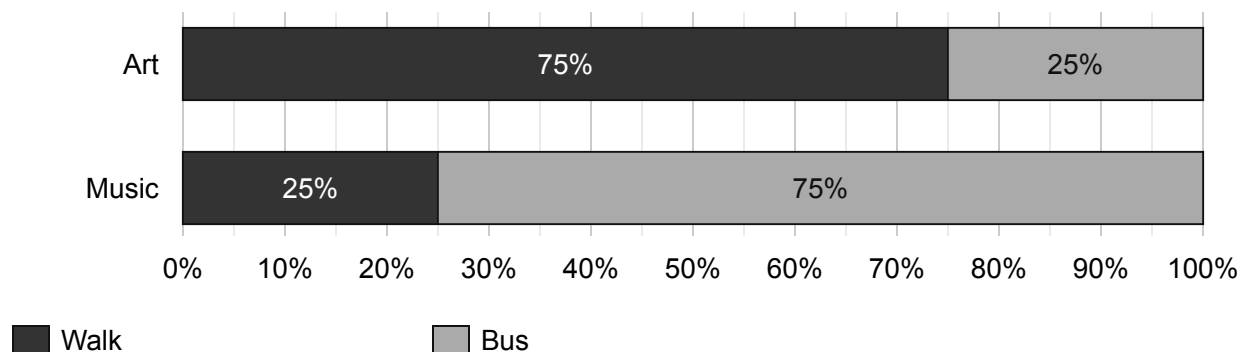
TASK 5

East has 70 yoga members and West 50, so 120 of 300=40% choose yoga. The unweighted average 42.5% is wrong because East has twice as many members; the combined percentage must weight group sizes. Convert each group's percentage to a count, add the counts, and divide by the combined membership.

TASK 6

Art walking rate= $30/40=75\%$; Music walking rate= $15/60=25\%$. Art bar widths 75% walk, 25% bus; Music 25% walk, 75% bus. Each row must be rescaled from its own marginal total to 100%. Use the stated reference group and check all totals against that denominator.

Travel within each club

**TASK 7**

Let a be the Art group size. Then $0.75a + 0.25(200-a) = 80$, giving $0.50a = 30$ and $a = 60$. Art has 60 people and 45 walkers; Music has 140 people and 35 walkers. The 80 walkers are 40% of 200.