

The Slab Takeoff: teacher script

Construction-management and estimating students walk a full-size slab, then take off concrete with thickened edges and waste, vapor retarder with laps, and rebar with splices and offcuts.

Prep: Tape the 24 ft x 32 ft outline (or roll out the print). Mark a 12-in band inside the perimeter (thickened edge) and a 16-in strip across the slab, 22 ft long, between the bands (interior bearing strip). Print the scenario sheet and one takeoff sheet per team.

Min	Step and what to do	Ask	Listen for
0-5	Hook Walk the outline with the class. "This is 768 square feet. How much concrete?"	What is wrong with just multiplying by 4 inches?	The thickened edge and the strip hold more concrete; waste is real.
5-10	Measure Teams verify the outline, band and strip with tapes. They compare with the scenario sheet.	Which dimensions did you actually measure?	Outline, band width, strip length and width.
10-25	Concrete Teams compute the slab, the extra depth under the band, and the extra under the strip; total; convert to cubic yards; add 5% waste; round up to the supplier's 1/4-yard increment.	Why add the band as extra depth only?	The top 4 in is already in the slab volume.
25-35	Vapor retarder Teams lay out 10-ft-wide strips running the 32-ft way with 6-in side laps, then count rolls (10 ft x 100 ft) and seam tape.	Why do laps change the count?	Each lap loses 6 in of coverage.
35-50	Rebar Teams count #4 bars at 18 in each way with 3-in cover, then order 20-ft stock with 24-in lap splices: first naively (two bars per run), then reusing offcuts.	How many bars did reusing offcuts save?	The optimized order is much smaller; see the key.
50-55	Exit ticket Individual exit ticket.		

Common misconceptions

- **Learners may think:** Volume is area x thickness, done. **Address it:** Thickened edges, strips and waste add real yards; take each solid separately.
- **Learners may think:** Order exactly what you computed. **Address it:** Concrete comes in increments and short loads cost extra; always round up to the increment after waste.

Supports

- Give the unit-conversion card: 1 cu yd = 27 cu ft; 4 in = 0.333 ft; 8 in = 0.667 ft; 16 in = 1.333 ft.
- Multilingual learners: label slab, band, strip, lap and splice on the floor with pictures.
- Extension: price the order with local unit prices and add a pump or short-load fee.

References

- **Perkins V (CTE):** postsecondary and secondary CTE program context

- **Vapor retarder laps:** manufacturer instructions based on ASTM E1643 call for side and end laps of at least 6 in, taped; follow the project specification

Scenario sheet

Slab 24 ft x 32 ft, 4 in thick. Thickened edge: 12 in wide, 12 in total depth (8 in below the slab), all around. Interior bearing strip: 16 in wide, 4 in extra depth, 22 ft long between the edge bands. Waste 5%; the supplier sells in 1/4-yd increments.

Vapor retarder: rolls 10 ft x 100 ft, strips run the 32-ft way, side laps 6 in, seams taped. Rebar: #4 at 18 in on center each way, 3-in cover at the edges, 20-ft stock, 24-in lap splices.

LEARNER SHEET • THE SLAB TAKEOFF

Name _____ Date _____

Quantity	Work	Answer
Slab volume (cu ft)		
Thickened edge band area (sq ft) and extra volume		
Interior strip extra volume		
Total cu ft / cu yd		
With 5% waste; order (1/4-yd)		
Vapor retarder strips, rolls, seam tape (ft)		
Bars each way		
Stock bars: two per run		
Stock bars: reusing offcuts		

Exit ticket

1. A 10 ft x 10 ft slab is 4 in thick. How many cubic yards before waste?

2. Strips are 10 ft wide with 6-in laps. How many strips cover a 19-ft width?

3. Bars at 12 in on center across 10 ft with 3-in cover at each edge. How many bars?

Answer key

Quantity	Answer
Slab	$24 \times 32 \times 0.333 = 256.0$ cu ft
Edge band	$768 - (22 \times 30) = 108$ sq ft $\times 0.667$ ft = 72.0 cu ft
Interior strip	$22 \times 1.333 \times 0.333 = 9.78$ cu ft
Total	337.78 cu ft = 12.51 cu yd
Order	$12.51 \times 1.05 = 13.14$ cu yd; order 13.25 cu yd
Vapor retarder	3 strips $\times 32$ ft = 96 ft of roll = 1 roll; seam tape 64 ft
Bars	16 bars run 32 ft (each 31.5 ft); 22 bars run 24 ft (each 23.5 ft)
Two stock bars per run	76 bars
Reusing offcuts	38 full bars + 18 cut into second pieces (13.5 ft and 5.5 ft) = 56 bars (1097 lf needed)

Exit ticket

1. A 10 ft x 10 ft slab is 4 in thick. How many cubic yards before waste?

Answer: 1.23 cu yd (33.33 cu ft / 27).

2. Strips are 10 ft wide with 6-in laps. How many strips cover a 19-ft width?

Answer: 2 strips cover 19.5 ft; 2 is enough.

3. Bars at 12 in on center across 10 ft with 3-in cover at each edge. How many bars?

Answer: 10 bars (114 in / 12 = 9 full spaces, + 1).

Scoring: 1 point each, plus 1 for showing units. 3 or more = secure.

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