Choose a Feasible Bridge

Grade 9 | Engineering | Visual learning | 40 minutes

Learning target

Screen designs against hard constraints before comparing weighted criteria.

Prerequisites and materials

Read tables; multiply and add whole numbers. Provide pages 2-3, pencil, and a calculator if needed. These are paper-based analyses of fictional data; no physical experiment is required.

Teaching sequence

7 min: Read the data and vocabulary.

8 min: Trace the diagram or organizer with a partner.

15 min: Complete the four application questions.

7 min: Compare calculations and justify conclusions.

3 min: Identify one limit of the model.

Assessment and access

12 points: 3 per response. Keep calculations, units, and reasoning visible. Allow oral rehearsal, annotate variables, and supply a calculator or worked example with different values during practice. For assessment, clarify directions without giving answers.

Extension

Propose a tie-breaker based on the supplied capacity data, and explain the tradeoff.

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PREVIEW - first two pages only. Full package includes responses and answer key.



Lesson reference

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Evaluate fictional paper-bridge designs from a supplied test record; no construction is required. A design must cost no more than 8 credits and hold at least 20 counters.

Vocabulary	Meaning
constraint	A requirement that must be met.
criterion	A feature used to compare acceptable options.
weighted score	A sum that gives some criteria more influence.

Reference data

Design	Cost	Capacity	Ease / durability
A	7	22	4 / 3
B	9	30	5 / 5
C	8	24	3 / 5

Use the visual model

Check cost <= 8 → Check capacity >= 20 → Score feasible designs

If either check fails, exclude the design. Then compare feasible scores.

Rules and assumptions

First screen both constraints. Then score only feasible designs: score = 2 x ease + 3 x durability. Ratings run from 1 to 5, with 5 better. A high score cannot override a failed constraint.



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