

Route Optimisation: Constraints & Cost

Compare multiple valid routes using distance, turns, cost or blocked cells rather than only “find any path”.

LEARN • PRACTISE • CREATE • REFLECT

Original BrightPencil Kids resource - adult-led where appropriate

A4 edition • 12 purposeful pages • review copy

Print. Learn. Grow.

Grown-up guide

Learning objective

Compare multiple valid routes using distance, turns, cost or blocked cells rather than only “find any path”.

Use this pack well

- Model the first example aloud, then let the learner try.
- Ask “How do you know?” more often than “Are you finished?”.
- Use real objects, talk, movement or observation when the activity suggests it.
- Stop or shorten the session if attention or enjoyment drops.
- Open-ended pages can have many successful answers.

Quality note

This resource was written originally for BrightPencil Kids. Curriculum sources informed scope and progression only; no third-party worksheet or story text is reproduced.

Learn the idea

1 A route can be valid but not optimal for the chosen criterion.

2 Constraints remove possible moves.

3 Optimisation requires a stated measure such as fewest moves or lowest cost.

Talk about it

Explain one idea in your own words. Give an example from real life, a drawing or an object if that helps.

Find any valid path on a 7x7 grid.

Find the fewest-move path.

Add costs to selected cells and find a lower-cost path.

Explain why shortest and cheapest may differ.

Add one constraint that changes the optimal solution.

Try it beyond the page

Real-world / hands-on connection

Use tokens on a paper grid and record route length/cost instead of relying only on memory.

Before you finish

What did you notice?

What evidence, object or example helped you?

What would you change if you tried again?

Create something

Your project

Create a delivery-route puzzle with three destinations, obstacles and a clear optimisation goal.

Use this space for planning, drawing, mapping, designing or notes.

Think deeper

1. Which strategy reduced uncertainty or work?

2. How did you verify the final answer?

3. When would changing strategy be sensible?

Quick review

1. In one sentence, explain the big idea of “Route Optimisation: Constraints & Cost”.

2. Draw or write one example that shows you understand.

3. Choose one activity from this pack and explain the strategy you used.

4. Write one question you still have.

Answer & discussion notes

Use these as guidance, not scripts. Open questions can have different successful responses when the reasoning is sensible and evidence-based.

1. Suggested response

Name the strategy and why it fit.

2. Suggested response

Use a second method, inverse operation, full clue check or model as appropriate.

3. Suggested response

When the current method is inefficient, confusing or produces a contradiction.

Review before publication

Check age fit, factual accuracy, clarity, accessibility, rights provenance and whether the activity works in practice. This file remains a review copy until those checks are signed off.

FINISH

My learning reflection

I finished this BrightPencil learning pack.

One thing I understand better now:

A strategy that helped me:

Something I created or noticed:

My next small question or goal:

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