

Explain, Prove or Disprove

Build informal mathematical/logical arguments and use counterexamples to challenge statements that are not always true.

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

Build informal mathematical/logical arguments and use counterexamples to challenge statements that are not always true.

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 An example can support understanding but one example does not prove a universal claim.

- 2 A counterexample disproves a claim that says “always”.

- 3 Explanations should connect steps, not just state an answer.

Talk about it

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

Test “all even numbers are multiples of 4” and find a counterexample.

Explain why the sum of two odd numbers is even using paired representations.

Compare evidence from examples with a general argument.

Identify a circular explanation.

Write a claim and challenge a partner to prove or disprove it.

Try it beyond the page

Real-world / hands-on connection

Use counters, drawings or number lines to justify one safe mathematical pattern to a trusted adult.

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 “Claim - Evidence - Reasoning - Counterexample?” reasoning card.

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

CHALLENGE

Think deeper

1. What does a counterexample do?

2. Does checking three examples prove an “always” claim?

3. What makes an explanation strong?

Quick review

1. In one sentence, explain the big idea of “Explain, Prove or Disprove”.

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

It shows a universal claim is false.

2. Suggested response

No.

3. Suggested response

Connected reasoning that justifies why the conclusion follows.

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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