Read an invented friction comparison

Which variables need controlling before a surface comparison is useful?

Read a completely invented steady-pull table, calculate its averages and identify what a real comparison would need to hold consistent.

Investigate | 15–25 minutes, or one table row | Paper and a pencil or pen, The supplied fictional force table; no pulling test or equipment required

Start here Copy this invented record in newtons (N): surface A, 2, 2, 2; surface B, 4, 4, 4. The model uses the same sliding block at steady speed on a level surface.

Fictional steady-pull records · not an experiment

Surface	1 (N)	2 (N)	3 (N)	Mean (N)
A	2	2	2	2
B	4	4	4	4

Same block · same load · level surface · steady speed

Mean difference: 4 − 2 = 2 N; ratio: 4 ÷ 2 = 2

Invented steady-pull table

1 State the model conditions

Assume the same block, contact face, added load, level track and steady speed for both surface labels. Each entry represents the horizontal pull needed to balance sliding friction in this simplified model.

2 Read and calculate

There are three fictional entries per surface. A averages (2 + 2 + 2) ÷ 3 = 2 N. B averages (4 + 4 + 4) ÷ 3 = 4 N. Keep the unit beside each result.

3 Make a bounded comparison

In this table, B needs 2 N more pull and twice A's average pull. These labels do not identify real materials. The table does not establish that a rough-looking surface always has a larger friction force.

4 Identify missing evidence

Name one condition that would need checking in a real investigation, such as a consistent load or speed. Do not turn invented entries into actual observations. You can finish by annotating the supplied table.

Fictional steady pull records

All six numbers were invented to practise reading a controlled comparison. Horizon did not perform a friction experiment.

• Surface A: 2, 2, 2 N; mean = 2 N. Surface B: 4, 4, 4 N; mean = 4 N.

• Difference of the means: 4 - 2 = 2 N. Ratio: 4 ÷ 2 = 2.

• At the assumed steady speed, the forward pull and backward sliding-friction force balance. Equal opposite forces do not mean the block is stationary.

What this example can show This model does not measure a coefficient of friction, test named materials or establish measurement precision. Real records can vary; constant invented numbers are not evidence of perfect measurement.

A different way

Read one row aloud, point to the larger mean or have someone scribe your explanation. Use only the invented records; no practical test is needed.

If you want to go further

Try another explicitly invented table: A: 1, 3, 2 N and B: 3, 5, 4 N. Both means remain 2 and 4 N, but each set now has a range of 2 N. Explain how a mean can hide variation.

Something to notice

Am I describing what the invented records say, or claiming an experiment happened?

Read or explore more

Horizon topic Friction Surfaces

https://launchhorizonhq.com/learn/friction-surfaces/

Horizon topic Forces Motion

https://launchhorizonhq.com/learn/forces-motion/

Horizon topic Physics

https://launchhorizonhq.com/learn/physics/

Institute of Physics, IOPSpark Friction

https://spark.iop.org/friction

National Institute of Standards and Technology SI Units

https://www.nist.gov/pml/owm/metric-si/si-units