NPL

Measurement At Home

Break a Flake

How strong are your breakfast cereal flakes?

- How do you think cereal type and flake width affects break point?
- The experiment finds the break point of cereal flakes
- NPL runs, designs and checks similar tests on materials for engineers to make the world safer

Estimated time: 30 minutes
No experience needed

Instructions

Watch the video (YouTube: A9sMdJpnulY)

1. Build your test apparatus. Arrange two pencils on your kitchen scales with a small gap between, and secure with Blue-tac.
2. Pick up your first flake for investigation.
3. Measure and write down the 'width' of the flake (not thickness). Also record type (cornflake, bran flake, etc).
4. Place the flake sample on the test apparatus so the larger length bridges the pencils.
5. Tare the scales (set them to zero).
6. Push your finger down on the flake between the pencils very slowly increasing pressure while looking at the scale's reading. Write down the reading when the flake breaks.
7. Convert your reading of the weight in kg to force by multiplying by 10. Your answer will now be in newtons (N).
8. Repeat for as many as you can, then copy your results into a table like the one below.
9. Enter your results in our webpage, one flake at a time.

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Flake type	Flake width (cm)	Reading on scales (kg)	Force = reading x 10 (N)	Comments

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Equipment required

Flat surface kitchen weighing scales
Two similar pencils/pens
Blu-tack or sticky tape
Cereal flakes
Ruler
Pencil and paper to record results

Risks

Make sure the measurement area is clean and tidy before and afterwards.

SI measurement units

- metre (m) for length
- newton (N) for force (= kg m / s^2)

Challenge Topics

Measurement Science, Maths, Physics, Materials Testing

Thoughts, tips and information

- Will wider flakes break with more force than narrow ones?
- Will breaking different types of flake need different forces?
- Does break force relate to crispiness and are cereals better when crispy?
- NPL has performed similar testing on biscuits and measured the sound of the snap to indicate crispness.
- Electronic weighing scales convert a force measurement to mass units (kg, g etc). By multiplying the kg reading by 10, we obtain the force value measured in newtons (written N).