



## DIY SCIENCE ACTIVITIES



### NINJA RULER SNAP

USE THE POWER OF AIR – AND DRAMATIC NINJA SKILLS – TO  
SNAP A RULER IN HALF

#### SAFETY:

- This will involve a flying ruler, or (hopefully) pieces of ruler! Wear eye protection (like sunglasses) while doing it. Plus, you'll look extra cool.
- Put sharp-edged pieces of ruler in the bin when you are done.
- Ask an adult to help you use an iron.

#### WHAT YOU NEED

- A sheet of newspaper
- An iron and a towel, or heavy books
- A thin wooden ruler that you don't mind breaking
- A sturdy table

#### WHAT TO DO

1. Place your ruler so it hangs over the edge of a table. Have around half of the length of the ruler sitting on the table, and half hanging over the edge.
2. Make sure you have plenty of room around you to move, and that no-one else is nearby.
3. Use the side of your hand to do a karate-like chop on the part of the ruler that sticks out off the table. Chop downwards hard and fast. Aim to hit the ruler 3-5cm from the edge of the table. Watch what happens. The ruler should go flying, but not break in half.
4. Make your sheet of newspaper as flat as possible, including removing creases. You could do this by putting it under heavy books for a while or asking an adult to help you iron it flat (keep the iron on a low and put the paper under a towel so you don't burn it).
5. Place your ruler so it hangs over the edge of the table again, with around half of the length of the ruler sitting on the table, and half hanging over the edge.
6. Place your flattened newspaper over the table and ruler, so the ruler is sandwiched in the middle. Leave the part of the ruler that hangs off the table uncovered by paper.
7. Push the newspaper flat so there are no air gaps between the paper and table.

8. Make sure you have plenty of room around you to move, and that no-one else is nearby.
9. Use the side of your hand to do a karate-like chop on the part of the ruler that sticks out off the table. Chop downwards hard and fast. Aim to hit the ruler 3-5cm from the edge of the table.
10. Hopefully the ruler will break in half! If it flips off the table, try again with a new piece of paper, and hit harder and faster.
11. Test this again using smaller pieces of paper, or different materials to cover the ruler, like a sheet of alfoil.

### WHAT'S HAPPENING?

While your ninja-skills are no doubt impressive, the ruler snaps due to air pressure.

Air pushes on the world around us with a lot of force. Every square centimetre of your body experiences about 1kg of air pressure at sea level. Imagine balancing a 1L bottle of milk on your fingertip, then multiply that all over your body! Thankfully, our bodies are used to this pressure, so we don't notice it most of the time.

When the ruler is placed under the newspaper, that means it's being held in place not just by the air above the ruler, but by the force of all the air above the paper.

Sometimes this doesn't work and the whole ruler flies away. That usually happens because air sneaks in between the paper and the table (either because the paper isn't completely flat, or because you hit the ruler slowly, lifting the paper up). When air sneaks in under the paper, it balances out the pressure.

If you want to reassure yourself that air pressure is important here, rather than just the weight of the paper, try scrunching the paper into a ball and putting it on top of the ruler before doing your best karate chop.