

BREAKING BAD!

THE ART OF OBLITERATING THINGS, IT'S SIMPLE PHYSICS, RIGHT?!

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Other students often ask how I seem to break things so easily, or what my secret is. There's nothing quite as satisfying as the sound of a board smashing or feeling it was like cutting through butter with a hot knife!

My secret is, in some ways found in the mysteries of the universe. Hmm, well, it's simple physics, right?!

I loved physics at school. And when I started breaking, one thing I thought about was Force! The simple high school equation I learned was that **force = mass x acceleration**. I thought "I can work with that".

Force – it's an **interaction** between two objects, such that **one has an impact on the other**.

Mass – it's a **measure of the amount of matter** in an object. Mass is usually measured in grams (g) or kilograms (kgs), which is what we think of as weight, but they aren't the same thing.



An object's mass is **constant in all circumstances**; contrast this with its weight, a force that depends on gravity. Your mass on the earth and the moon are identical, but your weight is not.

Acceleration – this isn't the same as speed, it's the **rate of change of speed or velocity over time**. (Speed is measured in, for instance, metres per second, acceleration is then metres per second squared).

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So, what does that all mean, and what on earth does it have to do with breaking boards?

Well, for starters, some of us have more mass than others. Does that mean we should all just aim to put on weight – nope! Trust me, the secret to good board breaking is not in having chicken nuggets, chips and chocolate for dinner every night!

But seriously, can I just break relatively easily because I have a lot of mass?

Maybe, but if I don't use that mass well and can't accelerate that mass, then perhaps not.

If you have small mass, but can accelerate really quickly (i.e. go from 0 to 100 in a split second like a Ferrari!) then you may well generate as much force as I can.

But if I can accelerate as quickly as a person with less mass then I'll most likely generate more force.

So I can't change the mass in my body, or can I?... When instructors tell someone to use the heel of their foot, or the ball of their foot, or the palm of their hand, we are getting them to **put all their mass into a single point of their body.**

Spreading out the force, reduces the mass in each part that connects with an object. So to maximise what mass you have, you have to **focus on getting the smallest possible part of your body to hit the target object.**



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Side note – I once saw a great demo at Questacon. The presenter put a board on a single balloon and stood on the board and, not surprisingly, the balloon exploded. The presenter then put about twenty balloons in a bag and put the board on top of that.

Not only could the presenter stand on it without breaking any balloons, but they ended up with at least 8 kids on the board with them and the balloons stayed intact. Because the **mass of the people was spread out over the entire surface of the board.**

What about acceleration? Can I affect that?

Bruce Lee mastered the one inch punch. He could break something or send someone flying backwards, starting from only an inch away.

To do that, he would have to have generated a **huge amount of acceleration (change in speed) in a very short space of time** and over a short distance. If you watch footage of him doing it, his entire body moves, and the acceleration and movement starts from his foot, moves up through his hips and then his torso and shoulders, then all the way to the tip of his fist.

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Not many of us are Bruce Lee! So one thing I've noticed in gradings, is how well people break the longer they make their stance.

That's because it's easier to change your speed over more time (or longer distance to the target).

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The Ferrari might go from 0 to 100 in a few seconds and over a short track, but my Hyundai takes a lot longer time and distance to crank up to the same speed.

Two people may get to the same rate of acceleration eventually (i.e. metres per second squared) but they may reach it at different times and over different distances.

Think about it, as a rate of change, we start from no change, to getting faster and faster per same bit of distance.



Sir often talks about **plyometrics**, **explosive action**. That's acceleration in action. Perhaps I'll write a whole article at some stage on accelerating, but google it and you'll find there are many drills you can do that increase fast-twitch (explosive) muscles and build speed and acceleration.

Have I told you all of my secrets now about breaking – well, actually, no.

I think another part of the secret is my voice! Yes, I have rather a reputation at the club, I know. But I'm not sure people realise that it helps with breaking.

I suspect, thinking about plyometrics and explosive action, that it explains a lot. When I work out or put my all into something, the kihap just comes naturally.

Its that **explosion of breath and release that pushes more energy out**. So if I'm trying to accelerate quicker, changing the rate of how fast my body can move, the more I expel and motivate that energy, the better. And kihaps are a way to do that.

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A big burst of vocalization at the point of impact drives my body harder and faster. Kihaps are even easier too, if you imagine the board as a person who means you harm – there's a lot to be said for imagining an enemy and what you would need to do to stop them. Visualisation helps a lot.

Also, you'll notice we tell people to try to break or aim behind the board – we do this for a reason, If you plan to put your impact at the point of the board, or are nervous about it, you will start to **decelerate before hitting it.** I find, my best breaks are when my mind takes a break, and my body just moves with complete intention to obliterate through the board.



So, pulling it all together, to break effectively requires a few things:

- **Mass** – put all your mass into the smallest bit of your body that you can
- **Acceleration** – work out how far you need to accelerate (longer stance is better) and accelerate fast
- **Kihap** – a way to express and focus energy
- **Aim behind the board** – if you aim for the board, you will subconsciously start to decelerate before hitting it
- **Visualise** – don't see a board, see an enemy and aim to stop them 100%
- **Flow** – stop thinking and let your body just react.

Can't wait to see everyone's board breaking at the next belt exam!

It's my favourite part of a grading! (And parents – get on the floor and find the satisfaction that comes with a good board break as well, its better than a coffee break!).