The Weight Of Atoms (Are All The Same Weight?)

Post by “Cassius” of March 26, 2026 at 6:58 AM

Last night in our zoom the question came up as to whether Epicurus held that atoms differ in weight. This is what AI has to say - take it for what its worth and let's discuss whether they differ in weight or not.

Atomic Weight (βάρος) in Epicurean Philosophy

Does Epicurus say atoms have different weights?

Yes — but with important qualifications. Epicurus lists weight alongside size and shape as one of the three intrinsic properties of atoms. However, the *relationship* between weight and the other properties is philosophically murky in ways that size is not.

The key passage is *Letter to Herodotus* §54: atoms differ in shape, size, and weight (βάρος). This seems straightforward. But complications arise immediately.

The Upper and Lower Bound Problem for Weight

Lower bound — every atom has *some* weight: This is unambiguous. Epicurus breaks decisively from Democritus here. Democritus did not attribute weight to atoms as an intrinsic property — weight for him was a *relational* or *emergent* phenomenon arising from atomic collisions and vortex motion. Epicurus insists weight is primitive and intrinsic: every atom, no matter how small, has weight, and weight is what drives the fundamental **downward motion** through the void (the *clinamen* aside). There is no weightless atom. So the lower bound is: at least some minimal quantum of weight, corresponding presumably to the smallest atom.

Upper bound — here it gets complicated: Unlike size, where Epicurus gives a clear upper bound (atoms must remain sub-perceptible), he does not give an equally crisp upper bound for weight in the *Letter to Herodotus*. The constraint that *seems* to apply is:

1. Weight must correlate at least roughly with size (a larger atom, having more minimal parts, should be heavier).

2. Since atomic size is bounded above by sub-perceptibility, atomic weight is *indirectly* bounded — an atom cannot be so heavy that it produces perceptible gravitational effects in isolation.
3. But Epicurus never states this explicitly for weight the way he does for size.

The Lucretius Complication

This is where things get genuinely difficult. **Lucretius, in *DRN* 2.225–242 and 2.333–380, appears to deny that atoms differ in weight at all** — or at least to deny that heavier atoms fall faster than lighter ones. His argument for the *clinamen* (the atomic swerve) depends on all atoms falling at the *same speed* in the void regardless of weight. This is the famous passage: in empty space, a feather and a lead ball fall at the same rate — only resistance (*plagae*) from surrounding matter creates apparent differences in falling speed.

This produces an apparent contradiction:

- Epicurus says atoms have different weights (βάρος varies).
- Lucretius says all atoms fall at the same speed.

How scholars resolve this:

Sedley (*Lucretius and the Transformation of Greek Wisdom*, 1998) argues these are not actually contradictory. Atoms have different *quantities* of weight, but in the infinite void with no resistance, the *rate* of fall is uniform regardless — because there is no medium to create differential drag. Weight differences matter only when atoms are *in collision* with other atoms, contributing to the mass and downward tendency of compound bodies. The weight of an atom is real but its effect on velocity is masked by the homogeneity of the void.

Bailey and others have argued more skeptically that Lucretius may simply be softening or misrepresenting Epicurus on this point.

Does Weight Scale with Size?

This is another contested question. The natural assumption is that a larger atom (more minimal parts) is also heavier. Epicurus seems to assume this, but he never makes it explicit. The problem is that shape also varies independently of size — a very intricately shaped atom might have more minimal parts than a compact spherical atom of the same overall dimensions. Weight, size, and shape are listed as *independent* variables in §54, which suggests they can

vary independently of each other — a philosophically awkward result if weight is just a function of volume.

Summary of Constraints

	Size (μέγεθος)	Weight (βάρος)
Lower bound	≥ 1 minimal part (ἐλάχιστον)	Every atom has some weight — no weightless atoms
Upper bound	Must remain sub-perceptible	Implicitly bounded by size; no explicit ceiling stated
Source of constraint	Minimal parts theory + empirical observation	Empirical (Democritus' weightless atoms contradicted by experience of falling bodies)
Varies independently of other properties?	Yes (from shape)	Disputed — may scale with size or vary independently
Key controversy	None — fairly settled	Whether weight affects fall speed; Epicurus vs. Lucretius apparent tension

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The sources available to us are *less developed* than treatment of size. The minimal parts doctrine gives size a rigorous lower bound with clear mathematical structure. Weight by contrast seems to be asserted as a primitive intrinsic property largely to explain *why* atoms move at all — and the upper bound problem is left more implicit than resolved.