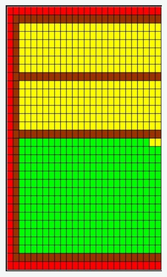
Nucleus Builder — A Structural Approach to Nuclear Stability

A model of nuclear construction inspired by the structure of Noah's Ark

Derek Marshall • *The Chemistry of God* • CreationFunction.com

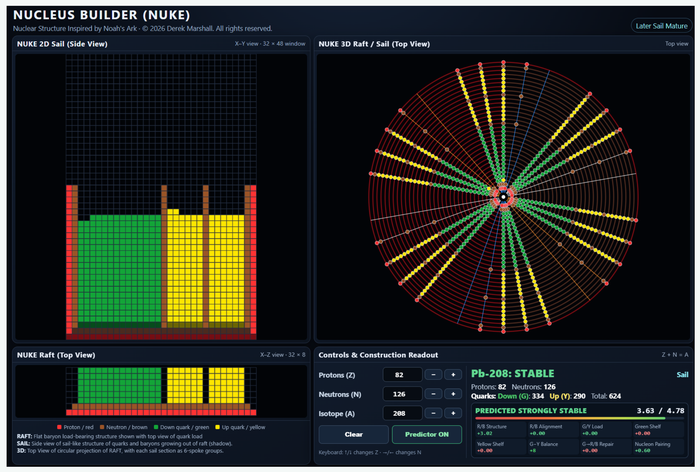
2010 | The Nucleus "Bilder" Concept



A half cross-section of Noah's Ark was divided into structural and cargo regions whose cell counts matched lead-208 in the original model.

Red: 82 protons
Brown: 126 neutrons
Green: 334 down quarks
Yellow: 290 up quarks

Could a single construction rule extend this fit to other nuclei by adding or removing cells? Could the resulting structures be used to predict nuclear stability?



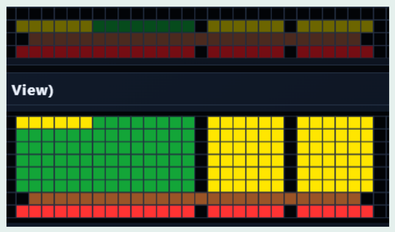
2026 | The Nucleus Builder Dashboard | Introduction

Choose an isotope by entering its proton count Z and neutron count N. The program builds a lattice and compares its stability prediction call with the Brookhaven National Laboratory wallet card reference label.

Proton and neutron markers act as supports. A support opens positions for quark markers, beginning in the flat lower portion, called the "raft". Each proton contributes two up and one down marker, and each neutron contributes one up and two down. The construction builds into the vertical upper portion called the "sail".

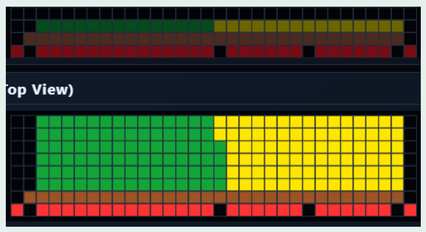
The screen displays the same construction as both a lattice and a radial projection. The scoring rule evaluates structural features, including how closely the red and brown supports advance together in the lattice. This is called "structural evenness". More closely aligned supports tend to correspond to greater nuclear stability.

How the program expands the lattice: Construction Stages



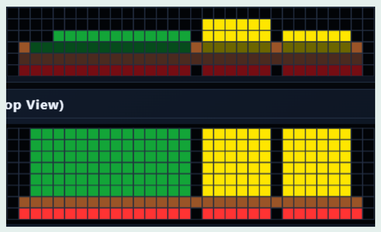
Raft

The "Raft" is the flat 30 × 6 base. Its three "shelves" are regions that hold quark markers. Four vertical support regions are empty in Fe-52 example.



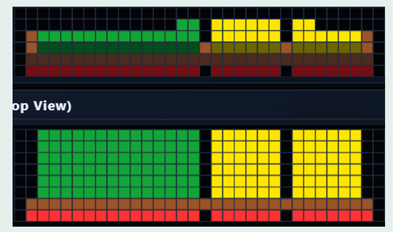
Corners

The Raft reaches capacity. Proton markers collect at corners while vertical supports are still unavailable. The central "cut" support region is filled in Ni-58.



Depleted Sail

As brown neutron supports appear in the upper portion, the "sail", red proton markers can move into the newly supported edge positions in Ni-62.



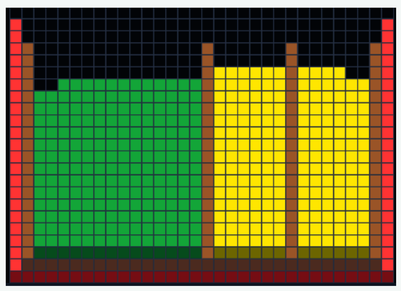
Sail

The Sail extends vertically above the Raft in five six-row groups. Ni-64 illustrates its development has achieved Draft Mature phase. In the radial projection, each six-row group maps to six spoke.

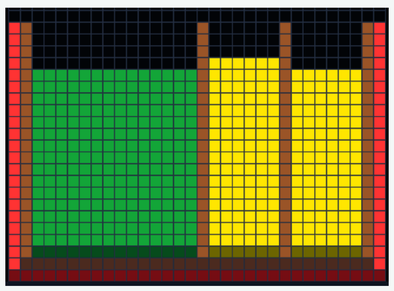
Illustrated examples from the presentation: Fe-52, Ni-58, Ni-62 and Ni-64. The Cut serves as temporary overflow until a growing wall closes it.

A worked example across tungsten isotopes in "Later Sail Mature" phase

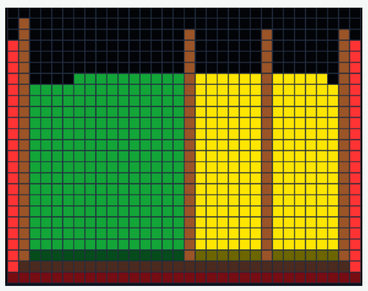
Hold Z at 74 and increase N. The same Sail rules produce three different arrangements. The score tests the relative advance of proton and neutron supports, shelf occupancy, and pairing. For W-176, red is far advanced beyond brown: but this evens out for W-184, in addition to filled green and yellow "shelves". At W-189, the score drops below the stability threshold.



W-176 / N = 102



W-184 / N = 110



W-189 / N = 115

Stability Criteria	W-176	W-184	W-189
Structural evenness (C1a)	1.665	3.025	2.088
Yellow shelves filled (C2b)	0	0.250	0
Pairing/Parity (C5)	0.600	0.600	0.300
Total score (threshold 2.70)	2.27	3.88	2.39
Model call	Unstable	Stable	Unstable

Scores follow programmed criteria adjusted for seven construction phases—Raft, Corners, Depleted Sail, Draft Developing, Draft Mature, Later Sail Developing, and Later Sail Mature. Structural evenness (C1a) begins with a maximum score and deducts points for uneven advancement of red and brown supports. Shelf completion (C2a/C2b) rewards filled green and yellow shelf capacity, with reduced credit for mixed-color shelves in the raft. Pairing (C5) adds or subtracts points, or remains neutral, according to whether proton and neutron counts are even or odd. Even–even counts generally earn more credit, while odd–odd counts generally incur a penalty.

Agreement across the reference set

Retrospective comparison with 2,783 ground-state entries from H through U. Above U predictions scored and shown for educational purposes only. The cutoff favors recovering stable entries, with a tradeoff in false stable calls.

Reference group	Met rule	Rate
Stable	233 / 253	92.09%
Unstable	2,268 / 2,417	93.84%
Long-lived*	109 / 113	96.46%
Combined	2610 / 2783	93.78%

* Long-lived (half-life > 1 Year) entries meet a separate score ceiling (≤ 3.55). The combined accuracy of 93.78% counts that rule alongside the binary results.

233 of 382 stable calls were correct

Among stable and unstable reference entries, precision was 61.0% and MCC was 0.719. The model missed 20 stable entries and called 149 unstable entries stable. The current decision rule is intentionally more tolerant of false-positive stability predictions than of missing known stable isotopes. Stable recall is preferred over raw accuracy. Missing a known stable isotope is treated as a more serious model failure than occasionally over-predicting stability.

Experimental nuclei are modelled and scored. The radial projection suggests a nuclear structural endpoint at Og-294. Beyond U-242, red and brown markers begin occupying positions otherwise reserved for quarks. Within the model's current geometry, all available positions are filled at Og-294, so heavier nuclei would require an extension of the model's geometry or placement rules.

What would better establish the value of the geometry?

Improve definition of "long-lived" predictions, as the nuclei are unstable, but many have half-lives of millions of years or longer. Add a criterion that incrementally lowers the score for nuclei whose support particles begin to occupy the load area in the radial plot. Also show these placements in the lattice. Then freeze the rules and test on held-out isotope chains. Separately, test whether shelf closures track measured separation energies and half-lives. This model is meant as a structural analogy to nuclear organization and does not replace QCD or the Nuclear Shell Model.

Sources: Derek Marshall, Nucleus Builder presentation and narration, slides 2–27. Final NUKE validation CSV (9_4_26), all available at CreationFunction.com. BNL reference labels. National Nuclear Data Center. *Nuclear Wallet Cards*. Brookhaven National Laboratory. https://www.nndc.bnl.gov/walletcards/ Figures are from the presentation. Numerical scores and denominators are from the final CSV. Interactive Nucleus Builder model: https://CreationFunction.com/nucleus-builder/