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Mr Newton's classroom

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Mr Newton's classroom

Mr Newton liked the blackboard, so his laptop remained in its case on the desk in front of him. He finished drawing his squiggles and arrows with an emphatic *chip chip* of the chalk. "So," he said, turning to the class. "What does beta minus decay tell us?"

There was a brief chitter of an iPod from the back and a rustle as Johnnie Dalton hid his *Heat* magazine. Then silence. I always felt out of my depth in Mr Newton's class, so I kept my head down.

"Let's go over it again," he said, pointing back to the board. "The neutron decays into a proton, an electron and an antineutrino, which departs at the speed of light." His hand dropped to the next stage of the schematic. "Then we annihilate the electron with a positron to produce gamma photons. We can also annihilate the proton with an antiproton to produce two neutral pions, which also decay into photons." He paused for dramatic effect, then peered over his aquiline nose to select a volunteer. "So, Hawking, what's matter made of?"

Hawking shrugged. "Black holes, sir? Tiny black holes that evaporate in a flash?"

Mr Newton cupped his ear. "A flash of what? Can anybody offer a flash of inspiration? Witten, what's matter made of?" Witten shrank into his desk. "Er, string, sir?" he squeaked.

"No, Witten, not string." Mr Newton's eyes scanned left and right. "Miss Curie?"

Curie sat in the sun by the window, fanning herself with an exercise book. "Radioactivity, Mr Newton?"

"Close, but I was looking for another word. Let's take it from the top. Dirac, what's the neutron made of?"

Dirac was at the desk on my left. I watched as he paused for too long, as he always did. You could never hurry Dirac. I caught a glint in his eye when he finally spoke up. "The same material as the *Moon*, sir – cheese!"

Gell-Mann obligingly shot up his hand, tongue out in eagerness. "There's more than one type, sir, but the generic name is quark, sir. The neutron is made of *quarks*."

Mr Newton turned to the blackboard and peered at it closely. "Quarks? I don't see any quarks. Anybody ever seen a free quark?"

"No, sir," Dickie Feynman piped up from my right. "But that's because they're partons, sir, just parts."

Then Kelvin chipped in from the front row. "They're like the loops of a knot," he began. He was about to say more but a rubber bounced off his head – straight back at Ernie Rutherford, who had thrown it – so Emmy Noether spoke up instead.

"It's to do with time, space and rotation..."

"...and that makes for waves," De Broglie interrupted. "Matter is made of waves."

Mr Newton turned round with a nod. "Good. Now we're getting somewhere. But waves of what? Bohr?"

Bohr was king of the back row. He sat back in his seat and smiled left and right. Then he angled his head and spoke. "Why, they're waves of *probability*, Mr Newton. And when you don't look at them, they don't exist."

I caught Mr Newton's deadpan look, and heard sniggers, but Bohr's smile just broadened. His sidekick Heisenberg joined in the fun.

"And when you do look at them, they're *uncertain*."

There was more laughter, and Mr Newton's eyes rolled



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For your homework, I'd like a thousand words on neutrons by Monday

to the clock above the door. From the corner of my eye I saw an arcing motion and ducked. Splat! A dollop of chewed paper hit the back of Schrödinger's chair. I saw Heaviside lean over to snatch a piece of paper off Maxwell's desk, then Pauli caught my attention, chewing and grinning at me as his arm went back. Chaos was about to erupt but then – *ring-a-ring-ring* – I was saved by the bell.

Physics lesson over, everybody started packing up to the sound of slamming desks. "For your homework," Mr Newton called out, "I'd like a thousand words on neutrons by Monday." He stood like an island as boys and girls poured eagerly past him, heading out the door. Before long it was just me and Mr Newton. He looked up and paused, then raised a brow.

"I'm sorry I didn't speak up, sir," I said, faltering. "I'm new here, and I'm very behind, but I *think* the neutron is made of energy."

"Thank you," said Mr Newton.

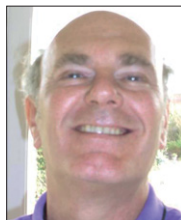
Then the words just tumbled out. "It isn't quite the same thing as light, Mr Newton. But I read about it in your book, where you said 'Are not gross bodies and light convertible into one another?' My uncle Albert showed it to me. He speaks very highly of you, sir."

"I'd rather like to meet your uncle Albert." Mr Newton zipped up his laptop case and swung it over his shoulder. "Perhaps he and I could have supper before I leave."

"Leave, sir?"

"Yes, I've got a job in the City. Apparently I'm going to make a mint." He looked at me, then walked to the door. He stood with his hand on the handle, surveying the classroom. "And to think," he mused, "that back in the day, I used to believe in intelligent design." He gave me a wry smile. "Don't forget to turn out the lights."

And then he strode out through the door, and was gone.



John Duffield is an amateur physicist based in Poole, UK, and author of the book *Relativity+*, e-mail johnduffield@btconnect.com