To continuously expand your skill set and achieve mastery over new and complex concepts, it's crucial to have a framework for conquering puzzling problems.

By Fadeke Adegbuyi—Doist 8 minute Read

Richard Feynman was a Nobel Prize-winning physicist who made significant contributions in areas such as quantum mechanics and particle physics. He also pioneered quantum computing, introducing the concept of nanotechnology. He was a renowned lecturer who taught at Cornell and Caltech.

Despite all of his accomplishments, Feynman thought of himself as "an ordinary person who studied hard." He believed that anyone was capable of learning with enough effort, even complex subjects like quantum mechanics and electromagnetic fields:

There's no miracle people. It just happens they got interested in this thing and they learned all this stuff. There's just people." – Richard Feynman*

What made Richard Feynman Richard Feynman (according to Richard Feynman, at least) wasn't innate intelligence, but the systematic way in which he identified the things he didn't know and then threw himself into understanding them inside and out. Throughout his work and life, Feynman provided insights into his process for considering complex concepts in the world of physics and distilling knowledge and ideas with elegance and simplicity. Many of these observations about his learning process have been collected into what we now call "The Feynman Technique".

The Feynman Technique is a learning concept you can use to understand just about anything.

To continuously expand your skillset and achieve mastery over new and complex concepts, it's crucial to have a framework for conquering puzzling problems ranging from computer science and product design to psychology and evolutionary biology.

This article will provide an overview of the Feynman Technique and how you can apply it to continuously expand your knowledge and skillset. In short, Feynman will teach you not *just* how to learn but how to truly *understand*.

What is the Feynman Technique?

"I was born not knowing and have had only a little time to change that here and there." – Richard Feynman

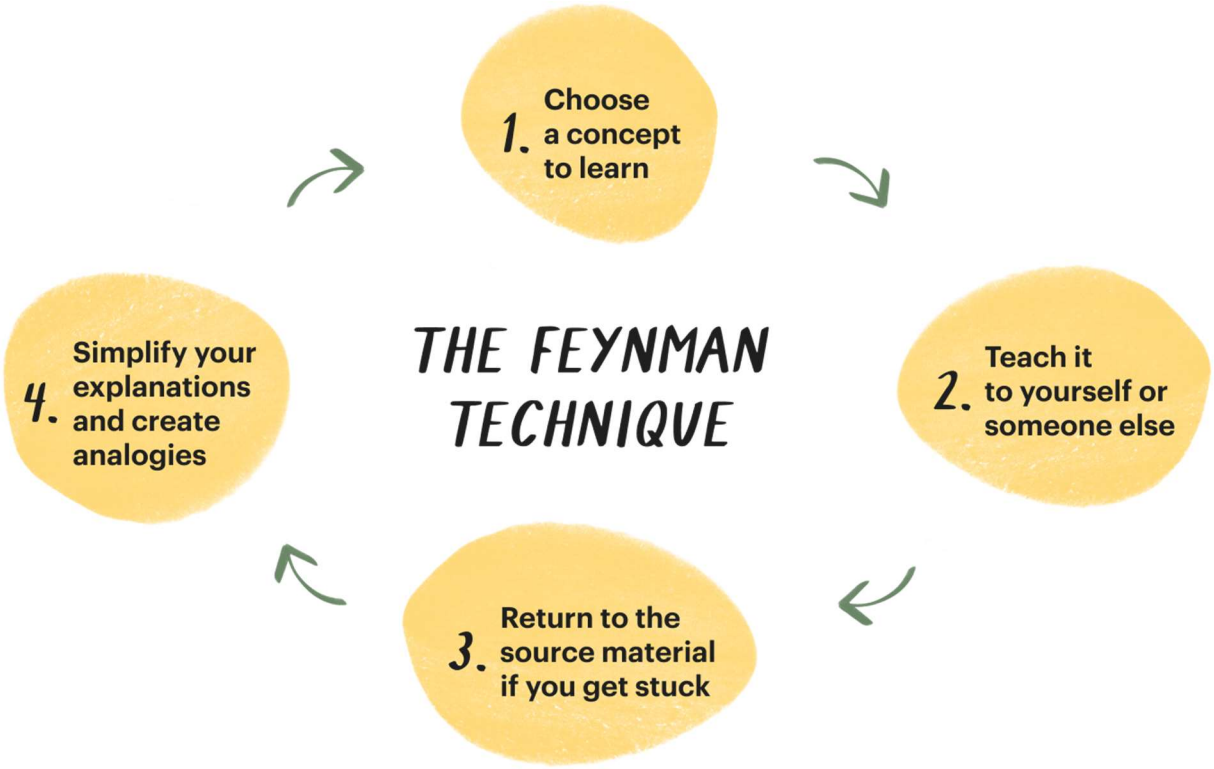
The Feynman Technique is a four-step process for understanding any topic. This technique rejects automated recall in favor of true comprehension gained through selection, research, writing, explaining, and refining.

Feynman's biography, penned by James Gleick, provides a host of clues into the famous physicist's learning process. Here's just one:

"In preparing for his oral qualifying examination, a rite of passage for every graduate student, he chose not to study the outlines of known physics. Instead he went up to MIT, where he could be alone, and opened a fresh notebook. On the title page he wrote: Notebook Of Things I Don't Know About. For the first but not the last time he reorganized his knowledge. He worked for weeks at disassembling each branch of physics, oiling the parts, and putting them back together, looking all the while for the raw edges and inconsistencies. He tried to find the essential kernels of each subject. When he was done he had a notebook of which he was especially proud."

He rejected rote memorization; believed that learning should be an active process of "trial and error, discovery, free inquiry"; and held that if you couldn't explain something clearly and simply it was because you didn't understand it well enough.

His philosophies make up the Feynman Technique:



1. **Choose a concept to learn**. Select a topic you're interested in learning about and write it at the top of a blank page in a notebook.
2. **Teach it to yourself or someone else**. Write everything you know about a topic out as if you were explaining it to yourself. Alternately, actually teach it to someone else.
3. **Return to the source material if you get stuck**. Go back to whatever you're learning from – a book, lecture notes, podcast – and fill the gaps in your knowledge.
4. **Simplify your explanations and create analogies**. Streamline your notes and explanation, further clarifying the topic until it seems obvious. Additionally, think of analogies that feel intuitive.

How the Feynman Technique Works

"I couldn't reduce it to the freshman level. That means we really don't understand it." – Richard Feynman

Often, we don't realize we don't understand something until it's too late.

Maybe you're facing down a question on an exam. Or someone asks you to explain a topic you thought you understood. And suddenly, your mind goes blank. When you're asked to demonstrate your knowledge outside your own head, you realize you knew a lot less than you thought.

The Feynman Technique doesn't let us fool ourselves into thinking we're masters of a subject when we're really amateurs. Each step of the process forces us to confront what we don't know, engage directly with the material, and clarify our understanding.

Choose a Concept to Learn

Selecting a concept to study compels you to be intentional about what you don't know. It also forces you to choose a topic that's small enough that it could reasonably fit onto one or several pages.

Why this step works:

- **You face what you don't know**. By writing a topic down on a blank page, you acknowledge you're starting from scratch or at least filling in some blanks. In doing so, take the initial step in the process.
- **You need to be specific**. Given the accumulated knowledge in the universe, most of us know nothing about most things! Writing down explicitly what you don't know provides you with a starting point.
- **You have to start small**. You really only have a page (or a few) to fill up with information. You can't fit everything there is to know about "Evolutionary Science" or "Microeconomics" or "Psychology" on a page. Instead, work on smaller more defined concepts or what might reliably be found on a midterm or final exam.

Explain it to yourself or teach it to someone else

"The first principle is that you must not fool yourself and you are the easiest person to fool." – Richard Feynman

A classic learning mistake is reading an article or textbook and considering our learning complete. In reality, reading is not understanding. We might even take notes, essentially transcribing a resource's sentences into our notebooks. We often nod to ourselves, thinking we've grasped a subject. After all, *we've taken notes*.

But true understanding requires a more active process like *teaching*. Start out by formally teaching yourself. Write out a summary in your own words without looking at your notes. Or explain it to yourself out loud. Then take it to the next level by teaching other people. Teaching also initiates a feedback loop, where critique or questions can help us learn and sharpen our thinking.

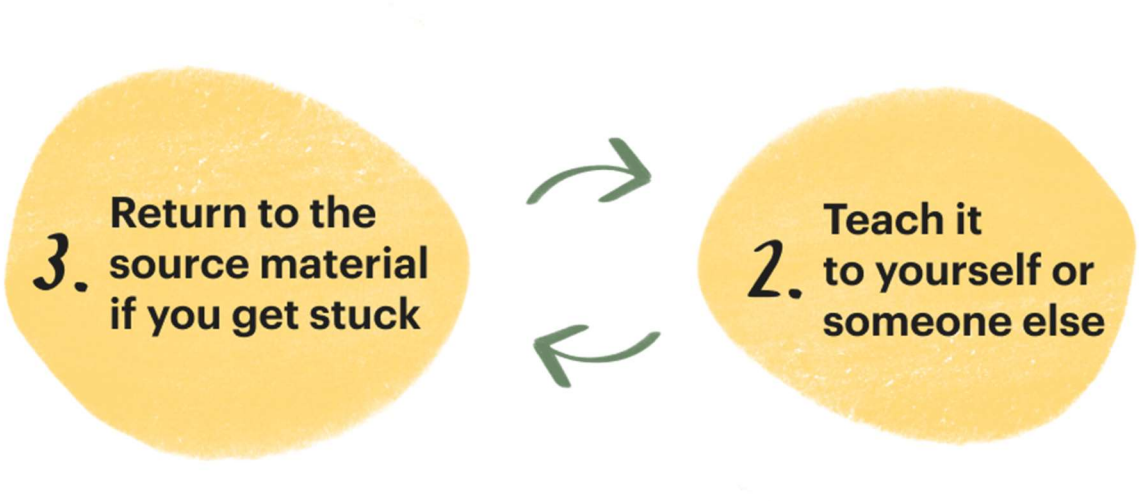
Why this step works:

- **It makes it harder to trick yourself**. When you have to truly explain something, whether through writing or aloud, you encounter the holes in your reasoning and the white spaces in your knowledge. Think of writing and teaching as a process to *obtain understanding*, not something you do once you already understand.
- **It's even harder to trick others.** If an explanation you're providing doesn't make sense, they'll often tell you or you can pick up cues like blank stares. As a test, ask them to repeat what you taught them in their own words. If they can't do this, your explanation is too complex –– simplify it and use plain language.
- **You build confidence**. When you truly understand something, it clicks. You can explain it forward and backward, pointing out exceptions and spotting logical inconsistencies. When this happens, it builds confidence and pushes you to tackle even more challenging subjects knowing you have a solid framework for learning.

Return to the source material if you get stuck

Learning should be iterative. More often than not, learning something challenging takes several attempts. With the Feynman Technique, returning to the source material is an explicit part of the learning process. When gaps in our knowledge arise and our explanations aren't quite right, revisiting our primary and secondary sources can help solidify what we're learning.

Getting it right will likely take several iterations. That's a good thing; the more you refine your explanations, the more your understanding will deepen.



Why this step works:

- **Learning becomes an iterative process.** Rather than viewing learning as a one-and-done, this step gives you permission to continuously refresh your knowledge.
- **You're actively engaged**. Using sources to polish our own explanations and models is an active process. When we learn passively, committing details to memory is more challenging. When we're actively part of creating our own summaries and reasoning, drawing intentionally from original information to fill our blind spots, we can more readily commit knowledge to our long-term memory.
- **You expand your knowledge base**. Paradoxically, the more we learn, the more *our capacity* to learn increases. Looking through a chapter of a textbook might feel like a different language the first time around. The second time it becomes more clear. The third time, with a strong base already, we pick up nuances we couldn't have possibly seen before.

Simplify your explanations and create your own analogies

Every field of study has its own specialized terms. While it may be important to know them, it's also important to not confuse knowing jargon with knowing concepts. The Feynman Technique involves simplifying our initial explanations and refining our understanding through simple analogies.

Why this step works:

- **Simplicity is a proxy for understanding.** It's easy enough to commit terms to memory, and repeat them back when prompted. But memorization is not understanding. When we can't rely on big words that make us sound smart, we have to distill what we truly know to the most basic form. This is where true understanding takes place.
- **Analogies are easier to recall and explain**. When you understand a challenging concept, analogies allow you to create a short-hand for recalling it quickly and explaining it to others clearly. Learning material often provides ready-made analogies for us. For example, we all probably have "the mitochondria are the powerhouse of the cell" burned into our collective memories. However, pushing ourselves to create our own analogies is even more powerful than regurgitating a borrowed one that we may not actually understand.

In Tyler Cowen's *Average is Over*, the renowned economist notes that technological advances are driving us towards a future of work where, "lacking the right training means being shut out of opportunities like never before." In describing the role of education in future economies, Cowen

argues that the person who finds success will increasingly be the one “who sits down and actually starts trying to master the material”.

Now, more than ever, it’s important to adopt the mindset of a life-long learner.

Learning new skills and information takes time and patience, but also humility. By starting with a blank page, you face what you don’t know head-on. From there, you only need a pen, resources, and the willingness to explore to embark on an indefinite learning quest.
