First-principles thinking works like this: First, you identify and define your assumptions; then, you break down the problem into its fundamental principles; and, lastly, you create new solutions from scratch.

## **Step 1: Identify and define your assumptions.**

"If I had an hour to solve a problem, I'd spend 55 minutes thinking about the problem and 5 minutes thinking about solutions." --Albert Einstein

Here are some examples from everyday life in business, health, and craft.

"Growing my business will cost a lot of money."

"I have to struggle and starve to become a successful artist."

"I just can't find enough time to work out and reach my weight-loss goals."

When next you're faced with a familiar problem or challenge, simply write down your assumptions about them. (You can stop here and write these down now.)

**Step 2: Break down the problem into its fundamental principles.**

"It is important to view knowledge as sort of semantic tree. Make sure you understand the fundamental principles, i.e., the trunk and big branches, before you get into the leaves/details or there is nothing for them to hang on to." --Elon Musk

These fundamental principles are basically the most basic truths or elements of anything.

The best way to uncover these truths is to ask powerful questions that uncover these ingenious gems.

Here's a quick example from Musk during an interview with Kevin Rose on how this works:

Somebody could say, "Battery packs are really expensive and that's just the way they will always be. Historically, it has cost $600 per kilowatt hour. It's not going to be much better than that in the future."

With first principles you say, "What are the material constituents of the batteries? What is the stock-market value of the material constituents?" It's got cobalt, nickel, aluminum, carbon, some polymers for separation, and a seal can. Break that down on a material basis and say, "If we bought that on the London Metal Exchange, what would each of those things cost?"

It's like $80 per kilowatt hour. So clearly you just need to think of clever ways to take those materials and combine them into the shape of a battery cell and you can have batteries that are much, much cheaper than anyone realizes.

This is classic first-principles thinking in action.

Instead of following the socially accepted beliefs that battery packs were expensive, Musk challenges these beliefs by asking powerful questions that uncover the basic truths or elements, e.g., carbon, nickel, aluminium. Then he creates ingenious innovative solutions from scratch.

**Step 3: Create solutions from scratch.**

"The person who says he knows what he thinks but cannot express it usually does not know what he thinks." --Mortimer Adler

Once you've identified and broken down your problems or assumptions into their most basic truths, you can begin to create new insightful solutions from scratch.

Here are three simple everyday examples of how this works (steps one through three).

**Assumption: "Growing my business will cost too much money."**

**First-principles thinking:**

What do you need to grow a profitable business? I need to sell products or services to more customers.

Does it have to cost a lot of money to sell to new customers? Not necessarily, but I'll probably need access to these new customers inexpensively.

Who has this access and how you can create a win-win deal? I guess I could partner with other businesses that serve the same customer and split the profits 50-50.

**Assumption: "I just can't find enough time to work out and reach my weight-loss goals."**

**First-principles thinking:**

What do you really need to reach your weight-loss goal? I need to exercise more, preferably five days a week for an hour each time.

Could you still lose weight exercising less frequently? If so, how? Possibly, I could try 15-minute workouts, three days a week. These could be quick, high-intensity full-body workouts that will speed up my fat loss in less time.

**Assumption: "I have to struggle and starve to become a successful artist."**

**First-principles thinking:**

What do you really need to create great work and make a good living as an artist? I would need a reasonably sized audience that will appreciate and buy my artwork.

What do you need to reach a larger audience? I probably need to do some marketing, but I don't like self-promoting, so I'd rather not do this.

OK, is there any way for you to promote your work without being sleazy? Yes, if the focus of selling my artwork is meaningful with a purpose of serving the audience, then I could make more money to make more art, so I can serve more people.

**Think differently**

Usually, when we're faced with complex problems, we default to thinking like everybody else. First-principles thinking is a powerful way to help you break out of this herd mentality, think outside the box, and innovate brand-new solutions to familiar problems.

By identifying your assumptions, breaking these down into their basic truths, and creating solutions from scratch, you can uncover these ingenious solutions to complex problems and make unique contributions.

*--*[*This post*](https://www.businessinsider.com/elon-musk-3-step-problem-solving-trick-thomas-edison-and-nikola-tesla-2019-3)*originally appeared on*[*Business Insider*](https://www.businessinsider.com/)*.*

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