The Gedanken Experiment

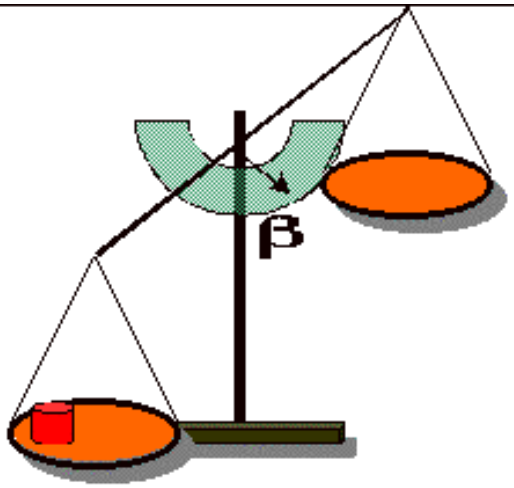
Gedanken is the German word for thought.

Einstein made gedanken experiments famous.

Since he didn't have the necessary equipment to perform experiments, he thought about how the experiments should work according to his intuition and theory.

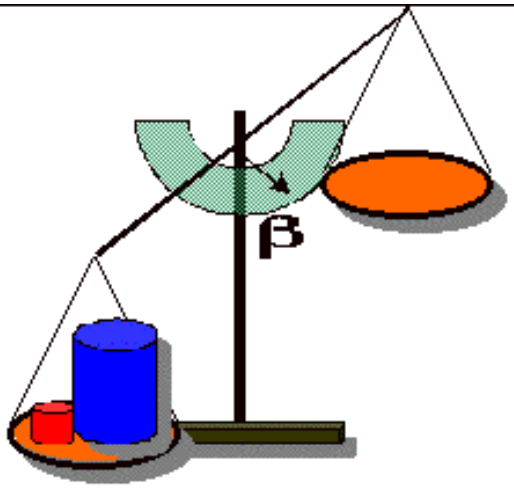
We can do our own gedanken experiment without a balance.

First, add just just enough weight to one side of a balance so that the pan just touches the table top.

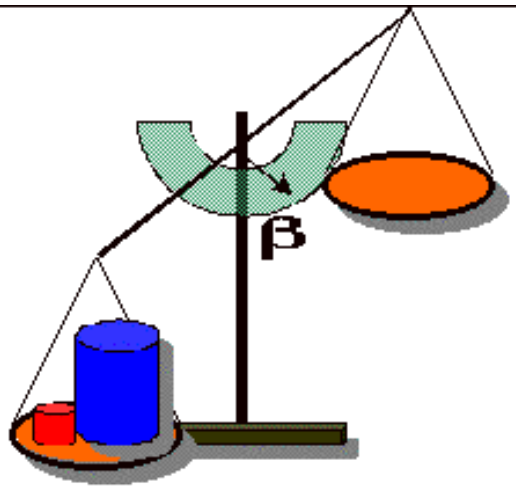


The position of the initial weight for our gedanken experiment

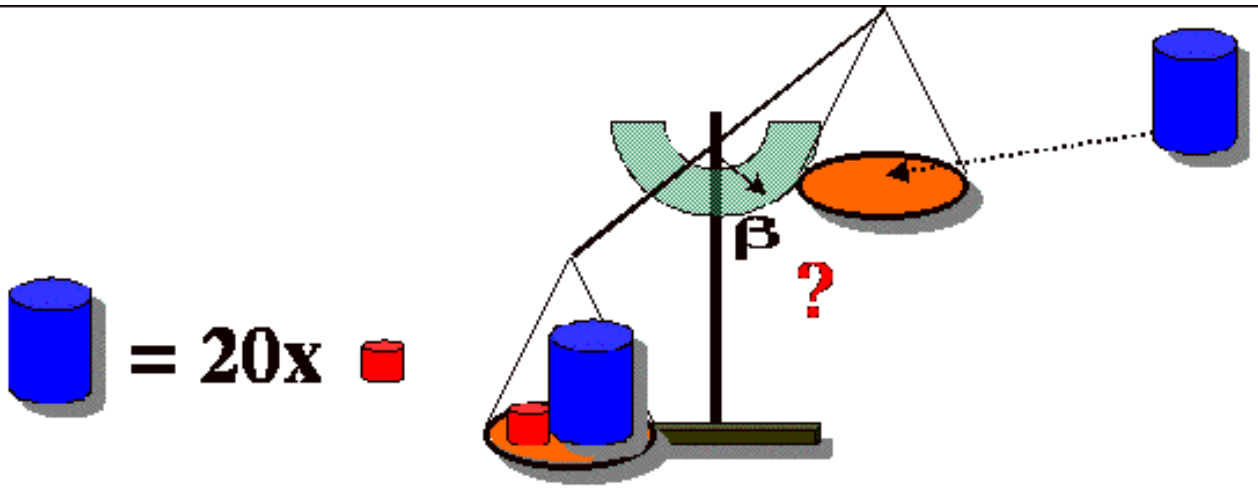
Next, add a weight that is twenty times larger than the weight that was used to make the balance just touch the table top to the same side.



The initial positions of the weights for our gedanken experiment

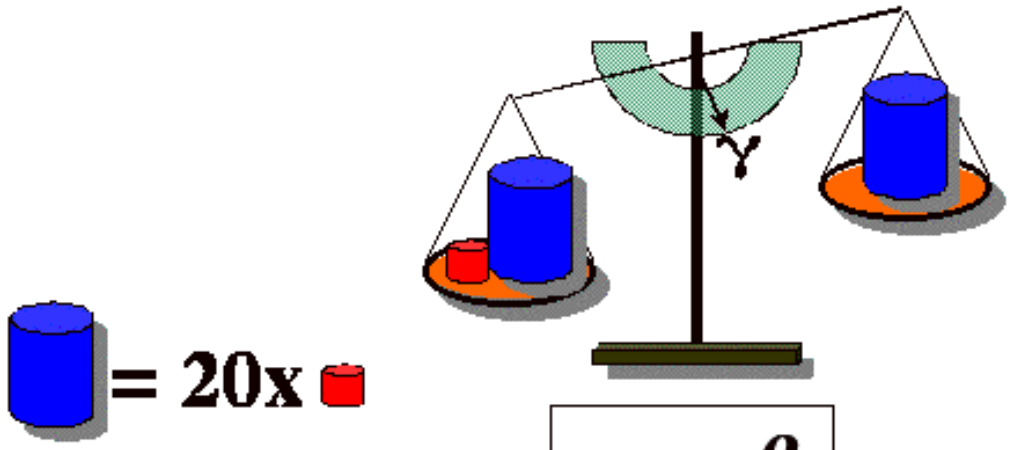


Since the left pan was already touching the tabletop, the larger weight won't shift the balance more than it was shifted.



Now ask yourself what will happen if we place another weight that is the same weight as the large, 20x, weight on the opposite side of the balance?

There are two choices. Either the balance continues to touch the tabletop or it moves.



Here's a diagram of what will happen if we place another weight that is the same weight as the large, 20x, weight on the opposite side of the balance.

If you answered that the balance would continue to touch the table top, you are not alone.

I initially thought so too, as did many other scientists, including a Princeton engineer and a scientist who makes and designs balances!

Did you get the right answer?

If you don't believe this, then you should get a simple, two-pan balance and try it for yourself.