

The Gedanken Experiment

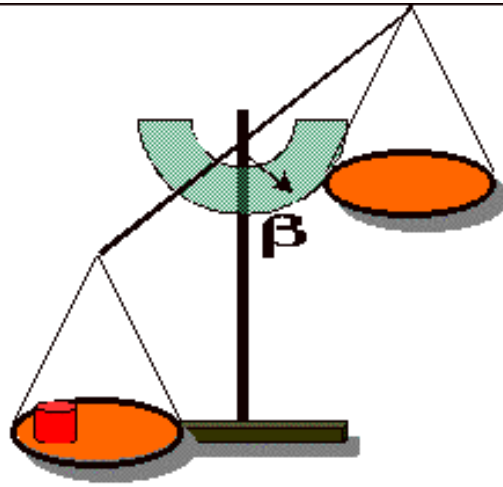
Gedanken is the German word for thought.

**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.**

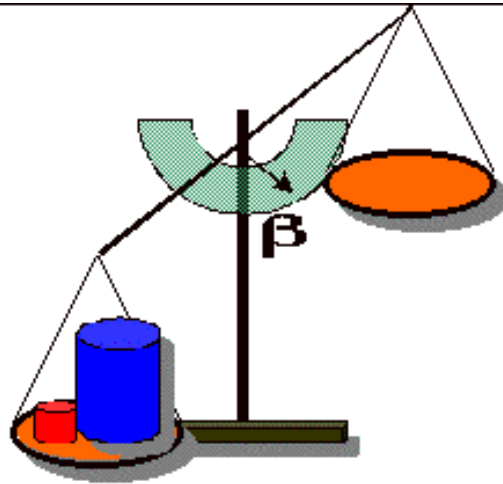
**We can do our own gedanken
experiment without a balance.**

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

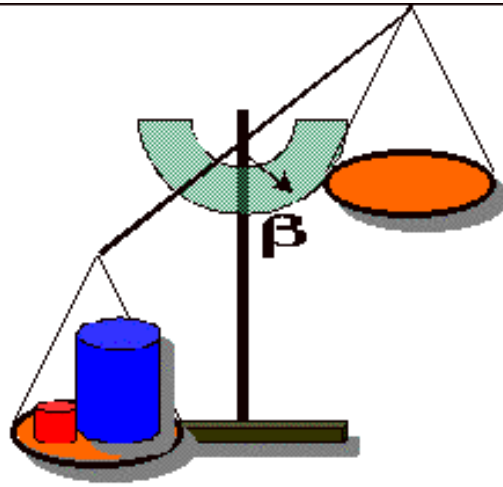


**The position of the initial weight
for our gedanken experiment**

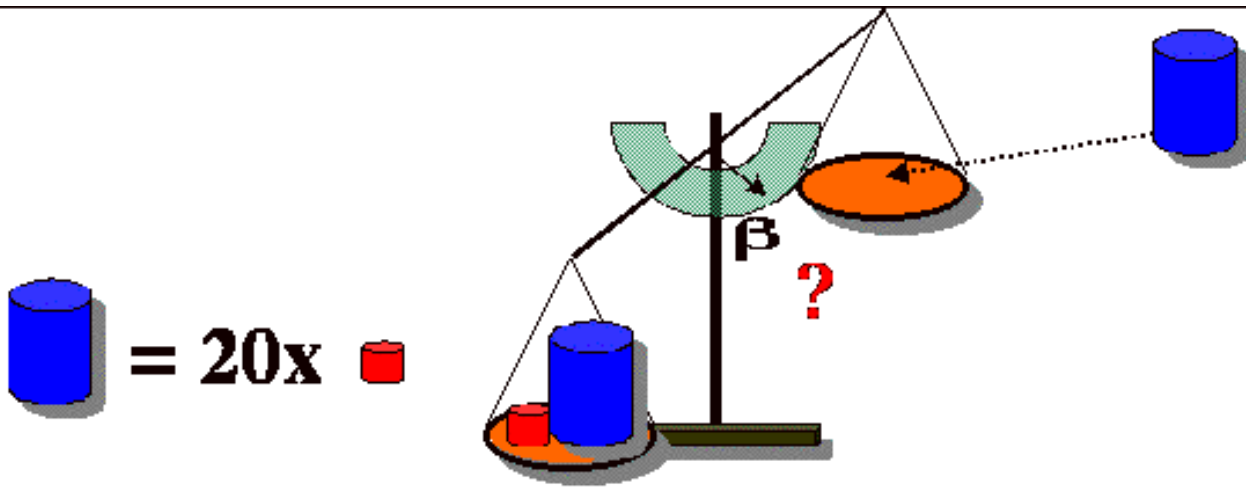
Next, add a weight that is twenty times larger than the weight that was used to make the balance just touch the table top to the same side.



**The initial positions of the weights
for our gedanken experiment**

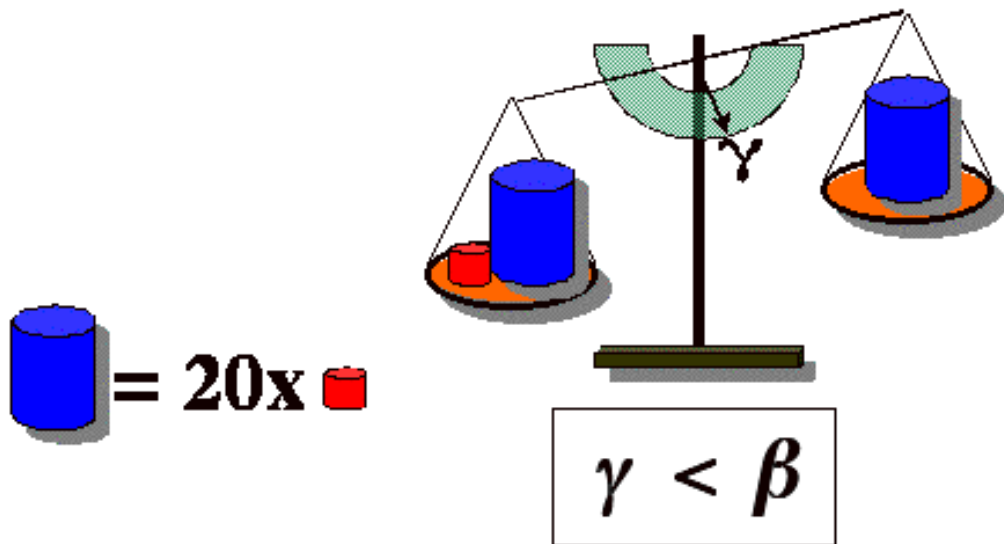


Since the left pan was already touching the tabletop, the larger weight won't shift the balance more than it was shifted.



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.