Fact: Liquid water is heavier than air. Fact: Clouds, which consist of water droplets and ice crystals, hover in the sky. Fact: The water droplets in a typical cloud together weigh many tons. Given these facts, how do clouds stay afloat?

**Cloud Matter**

Clouds form when warm, moist air rises to a greater altitude, causing it to expand and cool. Eventually, water vapor in the cooled air condenses into the droplets that form clouds. The condensed droplets are on average .000008 of an inch across, which is to say they are very, very small.

Despite their tiny size, the droplets still have mass and are therefore affected by gravity. They are so small, however, that rising air keeps the water droplets aloft. The effect is similar to how [dust appears to float](http://indianapublicmedia.org/amomentofscience/dust/) in a shaft of sunlight: Although gravity works on the bits of dust, even the gentlest currents are enough to keep them swirling around in the air.

**Rain Out**

Clouds, then, are not so much able to float as they are held up by surrounding air. In fact, the tiny cloud droplets do sink, but so slowly that it would take an hour for a single droplet to sink only one yard. And although the cumulative weight of a cloud’s droplets is many times that of the surrounding air, the droplets are spread out over a large enough area to render their weight almost negligible. When the droplets become larger, gravity overcomes the dragging forces of the rising air and the droplets fall to the earth as rain.

事实：液态水比空气重。事实：云层由水滴和冰晶组成，悬浮在天空中。事实：典型云中的水滴总重达数吨。鉴于这些事实，云如何维持下去？

### 云物质

当温暖潮湿的空气升高到更高的高度，使其膨胀和冷却时形成云。最终，冷却空气中的水蒸气凝结成形成云的液滴。凝结的液滴平均为.000008英寸宽，也就是说它们非常非常小。

尽管它们的尺寸很小，但液滴仍具有质量，因此受到重力的影响。然而，它们很小，上升的空气使水滴保持在高处。这种效果类似于[尘埃](http://indianapublicmedia.org/amomentofscience/dust/)在阳光下如何[浮动](http://indianapublicmedia.org/amomentofscience/dust/)：虽然重力作用于尘埃，但即使是最温和的水流也足以使它们在空气中旋转。

### 下雨了

因此，云层不能漂浮，因为它们被周围的空气阻挡。实际上，微小的云滴确实下沉，但是如此缓慢以至于单个液滴仅下沉一码就需要一个小时。虽然云雾滴的累积重量是周围空气的数倍，但是液滴分布在足够大的区域，使其重量几乎可以忽略不计。当液滴变大时，重力克服了上升空气的拖曳力，液滴随着雨水落到地上。