这张纸片托住了一整杯水

科学课上学到一个说法：空气有力量，而且力量大得能托住一杯水。我不信。空气天天扑在我脸上，风都吹不乱我的头发，它凭什么托住一杯水？放学回家，我把杯子、纸和自来水搬到餐桌上，决定自己试一次。

我先接水。杯子是家里最普通的玻璃杯，我把它凑到水龙头下面，让水慢慢涨到杯口。水接满以后我不敢再碰桌子，怕一晃就洒。水面上鼓起一个亮亮的圆顶，比杯口还高一点，像给杯子戴了一顶水帽子。我撕下一张卡纸，比杯子口大一圈，平平地盖上去，用手掌按住，把纸压得贴住杯口，一个缝也不留。手心全是汗，我在裤子上蹭了两下，又按回去。

最难的是倒过来这一步。我把胳膊伸直，让杯子离桌子高高的，然后手腕慢慢往下翻。翻到一半的时候，杯子横在天上，水往纸那边压过去，纸中间凹下去一点点。我的心跟着那一点凹陷提到了嗓子眼，心想完了，要洒，这半杯水要浇在数学作业上。我闭了一下眼，再睁开，杯子已经整个倒过来了。纸没掉。水没流。纸变成了一张薄薄的鼓面，托着一整杯晃都不晃的水。

我举着杯子一动不动，保持那个姿势数了六十个数，才慢慢把它翻回桌上。水只剩小半杯洒在桌面上，那是我翻回来时杯口离开纸漏的，不算它洒的。我喊我妈来看，让她也试一次。她盖纸的时候按得不严实，边上一个角翘着，倒过来没两秒，水就顺着那个角流下来，把抹布染透了。妈妈说，哦，要按严实。我说对，我查了，这叫大气压：杯子外面到处是空气，空气从下面往上顶住纸，顶得比一杯水的分量还大；纸边上漏了缝，空气从缝里钻进去，顶不住了，水就下来。

现在我不怀疑空气了。它不吹风的时候也在使劲，只是我们平时看不见它推的东西。我把空杯子倒扣在桌上，纸也不掉——那杯没有水，空气两边一平衡，纸就只是平平地待着。这个实验我一共做了五遍，越做越稳。手心的汗倒是每次都出，惊奇这件事，做五遍也不会打折。

This Paper Held Up a Whole Glass of Water

In science class we learned a claim: air has strength, enough strength to hold up a glass of water. I did not believe it. Air blows in my face every day, wind can't even mess up my hair, so how could it hold up a whole glass of water? After school I carried a glass, some paper, and tap water to the dining table and decided to try it myself.

First I filled the glass. It was the plainest glass at home. I held it under the faucet and let the water rise to the rim. Once full, I did not dare touch the table, afraid a shake would spill it. The water swelled into a shiny dome slightly higher than the rim, like the glass wearing a cap made of water. I tore off a piece of card paper, a ring bigger than the mouth, laid it flat on top, pressed with my palm so the paper clung to the rim with no gap left. My palm went sweaty; I wiped it twice on my trousers and pressed back down.

The hardest part was turning it over. I stretched my arm out, held the glass high above the table, and slowly rolled my wrist downward. Halfway through, the glass hung sideways in the air, the water pressing toward the paper, and the middle of the paper dimpled in just a little. My heart jumped to my throat with that little dimple — it is over, I thought, it will spill, this half glass of water will flood my math homework. I shut my eyes for a second, opened them, and the glass was fully upside down. The paper did not fall. The water did not run. The paper had become a thin, bulging drumhead holding up a whole glass of water that did not even slosh.

I held the glass motionless, kept that pose while counting to sixty, then slowly turned it back onto the table. Only a small splash of water ended up on the table — that leaked when the rim lifted off the paper on the way back, so I do not count it as a spill. I called my mother to watch, then made her try. She did not press the paper down tight; one corner at the edge curled up, and two seconds after turning it over the water ran down that corner and soaked the rag. My mother said, oh, it has to be sealed tight. I said right, I looked it up — it is called air pressure: air is everywhere outside the glass, pressing upward on the paper from below, harder than the weight of a glass of water; if the edge of the paper leaks, air sneaks in through the gap, the push fails, and the water comes down.

Now I no longer doubt the air. Even when it is not blowing a wind it is still pushing hard; we just cannot see what it pushes. I turned an empty glass upside down on the table and the paper stayed — with no water inside, the air balances on both sides and the paper simply sits flat. I did this experiment five times in all, steadier each time. My palm sweats every single time, though. The amazement does not wear off after five tries.

上台做实验前我紧张得手抖

科学课上，老师讲完大气压，问谁愿意上台做纸片托水的演示。教室里一下子安静了，我本来只想坐在座位上鼓掌，可老师看见了我举了一半又缩回去的手，说，就你吧。我站起来的时候腿有点软，讲台上的水杯、盆和卡纸看起来都特别大。

老师把盆垫在讲台边上，说万一洒了水进盆里。我先把玻璃杯凑到水壶下面接水，接得太满，端回讲台的路上水一直晃到杯沿，我走得更慢了，全班盯着我走，我觉得那几步路有一百米长。到了讲台，我把卡纸盖上去，用食指按着。轮到手腕翻的时候，我发现自己的手在抖，抖得很轻微，但杯子边上的水纹跟着抖。我心想别抖啊，然后手腕一翻，翻得太急，纸滑了，整杯水哗地倒在盆里，只差一点就浇到老师的鞋。

教室里有人笑，有人吸一口气。我的耳朵烫得厉害，站在原地不知道手往哪放。老师没说我，只

把杯子重新递给我，说再来一次，科学家做这个实验也洒过水。我把盆里的水倒掉，重新接了一杯，这回只接到九分满。我深吸一口气，数了一二三，才把纸按上去，按了整整十秒，感觉纸和杯口粘成一块了，才慢慢往下翻。翻的过程我只盯住纸的边，边没有翘，我就一直翻。杯子倒过来了。纸托着水，稳稳的。我举了十秒，才翻回盆上。

全班哗地鼓掌，后排的赵小磊喊了一声牛。我下讲台的时候腿还是软的，不过这回是高兴的软。回座位后同桌问我，你第一次是不是故意的。我说不是，我手抖得自己都看见了。同桌说，那你第二次怎么不抖了。我想了想说，第二次光顾着数一二三了，没工夫抖。

后来我在周记里写：这个实验教会我的不只是大气压。手抖的时候，杯子会替你诚实；洒了那杯水没什么，重新接一杯就行。科学课上老师还说过一句话，我抄在文具盒背面：失败是实验的一部分。现在我觉得这句话挺好听——它的意思是，洒掉的那杯，也算做完了。

My Hands Shook Before I Went on Stage

In science class, after the teacher finished explaining air pressure, she asked who would come up front and demonstrate the paper-holds-water trick. The room went silent all at once. I had only meant to stay in my seat and clap, but the teacher spotted my hand halfway raised and then pulled back, and said, you it is. My legs went soft as I stood up. On the podium, the glass, the basin, and the card paper all looked enormous.

The teacher set the basin at the edge of the podium, saying in case of spills the water goes into the basin. I filled the glass under the pitcher, filled it too full, and on the walk back to the podium the water kept rocking to the rim. I walked slower, the whole class watching my steps, and those few steps felt a hundred meters long. At the podium I laid the card on top and pressed with my index finger. When it came time to roll my wrist, I noticed my hand was shaking — barely, but the water rings at the glass's edge trembled along with it. Stop shaking, I told myself, then flipped my wrist too fast. The paper slipped, and the whole glass crashed into the basin, missing the teacher's shoes by a little.

Some in the class laughed, some gasped. My ears burned; I stood there not knowing where to put my hands. The teacher did not scold me. She just handed me the glass again and said try once more — scientists spilled water doing this experiment too. I emptied the basin, refilled the glass, this time only to nine-tenths. I took a deep breath, counted one, two, three, then pressed the paper down and held the press for a full ten seconds, until the paper and the rim felt like one piece, and only then turned it over slowly. During the turn I watched only the edge of the paper; as long as the edge did not curl, I kept turning. The glass came upside down. The paper held the water, steady. I held it up for ten seconds, then turned it back over the basin.

The whole class burst into applause, and Zhao Xiaolei in the back row shouted one word: awesome. My legs were still soft walking off the podium, but this time it was the happy kind of soft. Back at my desk my deskmate asked if the first failure was on purpose. I said no — my hands shook so much I saw it myself. He asked why they did not shake the second time. I thought a while and said: on the second try I was busy counting one-two-three and had no time to shake.

Later I wrote in my weekly journal: this experiment taught me more than air pressure. When your hands shake, the glass tells the truth for you; and spilling that glass is nothing — just fill another one. The teacher once said a line I copied onto the back of my pencil case: failure is part of the experiment. Now I think that line sounds nice. It means the spilled glass counts as done, too.

什么纸都能托住水吗

科学课本上有纸片托水的实验，我照做成功了，全班都成功了。可回家路上我琢磨一个问题：书上用卡纸，那餐巾纸行不行？作业纸呢？要是什么纸都行，这个实验也太随便了。到家我把能找到的纸全剪成比杯口大一圈的圆片：餐巾纸两张，作业纸一张，卡纸一张，还有从旧挂历上撕的一块硬纸板。杯子、水、盆，都在餐桌上排好。

第一个试餐巾纸。盖上去按平，倒过来，纸刚变成承重的姿势就软了，塌下来，水连着纸一起砸进盆里。餐巾纸一湿就烂，它不是托不住，是自己先趴下了。第二个试作业纸。作业纸撑住了三秒，纸心湿透以后中间裂开，水从裂缝里下来。第三个卡纸，稳稳的，跟课上一样。第四个硬纸板最夸张，倒过来以后我把它放在一根筷子顶上试了试，它托着水在筷子上站住了，像一个小喷泉底座。我把结果挨个记在作业纸背面：餐巾纸，秒败；作业纸，撑三秒；卡纸，成功；硬纸板，成功还带加时。

看出门道以后我又改了玩法。卡纸换成正方形，杯里的水从满杯改成半杯，倒过来，居然也成功，只是纸中间凹得更深。我有点糊涂：水少了，纸反而凹得厉害？我去问爸爸。爸爸说，托住纸的还是空气，空气从下面往上顶，顶的力气比水那点头脑大；水少了，往下压的少了，可空气也没变，所以纸照样不掉，凹得深是因为杯里空出来的地方气压在调整。我听了个大概，但我记住了一句：空气四面八方都在顶，不只从下面。

为了验证这句，我把杯子倒过来以后又慢慢把杯口斜到侧面，纸贴着杯口，水也没流。杯口朝天斜着，空气从斜下方顶着纸，照样顶得住。我把这个画进实验报告，画了一个杯子加四支箭头，从下、左、右、斜下方指着纸。科学老师在我的报告上画了一个大红勾，批了四个字：会自己问。

现在我家餐桌上还贴着一张单子，是我写的纸片托水选纸指南：要硬，要不怕湿，要比杯口大。我妈用它挑过一次垫桌脚的纸板。课本上的实验做完只要五分钟，可顺着它往下问，我问出了一个星期的晚上。问题这个东西，跟大气压一样，看不见，但真的有力气。

Can Any Paper Hold Up Water?

Our science textbook has the paper-holds-water experiment. I did it and succeeded, and so did the whole class. But on the way home I chewed on a question: the book uses card paper — would napkin paper work? Homework paper? If any paper works, the experiment is too casual. At home I cut every paper I could find into circles a ring wider than the glass mouth: two napkins, one sheet of homework paper, one card, and a piece torn off an old wall calendar. Glass, water, basin — all lined up on the dining table.

Napkin first. I laid it on, pressed it flat, turned the glass over, and the paper collapsed the moment it took the load — water and paper crashed into the basin together. Napkin paper disintegrates when wet; it was not that it could not hold, it simply gave out first. Homework paper next. It held for three seconds, then its soaked center split open and the water came through the crack. The card was third — steady, exactly like in class. The calendar board was the wildest: after turning it over, I propped it on the tip of a chopstick, and it stood there holding the water on the chopstick like the base of a little fountain. I recorded each result on the back of a homework sheet: napkin, instant defeat; homework paper, three seconds; card, success; calendar board, success with overtime.

Once I saw the pattern I changed the game. I swapped in a square card, cut the water from a full glass to half, turned it over — it still worked, only the paper dimpled deeper. I got confused: less water, and the paper sags more? I asked my father. He said the thing holding the paper is still the air, pushing up from below with more strength than the water's little head of weight; with less water pressing down, the air has not changed, so the paper still does not fall — it dimples deeper because the air pressure inside the empty space is adjusting. I caught the drift of it, but I kept one line: air pushes from every direction, not only from below.

To test that line, after turning the glass upside down I slowly tilted its mouth sideways. The paper clung to the rim, and the water still did not run. With the mouth slanted, air pressed the paper from the lower side and held. I drew this into my lab report: one glass with four arrows pointing at the paper from below, left, right, and diagonally under. My science teacher drew one big red check on my report and wrote four words: asks its own questions.

Our dining table still has a list taped to it — my paper-for-holding-water buying guide: must be stiff, must resist wet, must be wider than the glass mouth. My mother once used it to pick a board for propping up the table. The textbook experiment takes five minutes, but following its thread I questioned my way through a whole week of evenings. Questions are like air pressure: invisible, but they really push.