纸飞机比赛，我们组赢在提问

班级纸飞机比赛，我们组拿了第一。颁奖的时候，物理老师问我们：你们是不是天生会折飞机？我说不是，我们赢在先把问题问对。这句话不是客气，是我们三个星期前真的从乱试开始的。

第一次试飞，我们组四个人各折各的，扔出来的结果五花八门：有的栽跟头，有的飘得远。有人喊换这种折法，有人喊把头折重一点，场面一度像猜谜。我拦住他们，提了个建议：先别折，先想清楚我们到底在问什么。我们在纸上写：飞机飞得远，跟什么有关？能想到的写了一排——机翼宽窄、机头轻重、机翼上翘、折的层数、扔的力气。然后划掉扔的力气，因为比赛每人扔三次，力气没法比。剩下的每一项，都是一个能测的问题。

我们挑出最怀疑的两项：机头轻重和机翼宽窄。设计实验时，我们规定每次只改一处：同一张A4纸、同一种折法、同一个人站在同一条线后扔，量三次取平均。机头加一枚回形针，飞距从平均六米二变成七米四；机翼加宽两厘米，反而缩到五米八。两个结论都写进了记录本：适当加重机头飞得更远，机翼不是越宽越好。

比赛那天，我们用的是测出来的那一架：机头夹一枚回形针，机翼保持原宽，翼尖微微上翘。三次最好成绩九米一，第二名差了我们一米多。对手跑来看我们的飞机，翻来翻去说：看起来也没什么特别的。我说特别在数据里。

赛后我想了很久，我们真正的转折点是那次拦住乱试、先在纸上写问题。提出一个能测的问题，比急着动手值钱十倍。这个习惯后来跟到了我的学习里：数学难题先问自己卡在哪一步，英语阅读先问题目在问什么，都比上来就埋头省时间。连周末怎么安排，我也会先问：我到底想解决什么？

提出问题、设计实验、得出结论——课本上是三个短语，在我们组那儿是三周的纸飞机。科学思考不是实验室里的仪式，它从一句先想清楚我们在问什么开始。

Our Paper Airplane Team Won by Asking the Right Question

Our team won first place in the class paper airplane contest. At the awards, our physics teacher asked: were you just born good at folding planes? I said no - we won by asking the right question first. That is not modesty. Three weeks earlier, we had truly started out flailing.

At the first test flight, the four of us each folded our own design, and the results went every which way: some planes nose-dived, some glided far. One shouted for a different fold, another for a heavier nose, and for a while it looked like a guessing game. I stopped them and made a suggestion: before folding, let us be clear about what question we are actually asking. On paper we wrote: what does a plane's distance depend on? We listed everything we could think of - wing width, nose weight, upturned wingtips, number of folded layers, throwing strength. Then we crossed out throwing strength, because in the contest everyone throws three times and strength

cannot be compared. Every item left was a question we could test.

We picked the two we doubted most: nose weight and wing width. In designing the test, we ruled that only one thing could change at a time: the same A4 sheet, the same fold, the same person throwing from behind the same line, three throws averaged. Adding one paperclip to the nose took the distance from an average of 6.2 meters to 7.4; widening the wings by two centimeters pulled it back to 5.8. Both conclusions went into the notebook: a moderately weighted nose flies farther, and wings are not better the wider they are.

On contest day we flew the tested design: one paperclip at the nose, wings at their original width, tips turned up slightly. Our best of three throws was 9.1 meters, more than a meter ahead of second place. A rival came over, turned our plane over and over, and said: it looks nothing special. I said the special part is in the data.

Afterward I thought about it for a long time. Our real turning point was that moment of stopping the flailing and writing the questions on paper first. Asking a testable question is ten times more valuable than rushing to act. The habit followed me into my studies: for a hard math problem I first ask which step I am stuck at; for English reading I first ask what the question is asking. Both save time compared with burying my head in immediately. Even planning my weekend, I start with: what am I actually trying to solve?

Ask a question, design a test, draw a conclusion - in the textbook these are three phrases; for our team they were three weeks of paper airplanes. Scientific thinking is not a laboratory ritual. It begins with one sentence: let us first be clear about what we are asking.