备课本上那一页：今天让火山喷一次

备课本翻到火山那一页，我用铅笔在边上写了一行小字：这次不演示，让他们自己做。当科学老师第六年，往年的火山都是我在讲台上喷给他们看，泡泡冒起来，他们哇一声，然后翻开课本。我觉得那一声哇太便宜了，来得容易，忘得也快。

实验前一周，我把全班分成八个小组，每组发一卷报纸、一瓶浆糊、一个空瓶。任务单上写着：先造一座火山，下节课让它喷发。课代表担心地问：老师，会弄脏教室吗？我说：会，非常脏。他眼睛亮了。

那一周，教室后墙排着八座歪歪扭扭的火山。有的山坡糊得太厚，像发面馒头；有的火山口剪得太大，像碗。没有一座好看，全是他们自己的手做的。我在走廊上看它们，像看一排等着开饭的孩子。

实验课那天，我在讲台边只发材料：白醋、小苏打、洗洁精、色素、量杯、托盘。我不说步骤，步骤在任务单上。第一组倒白醋的是个平时上课从不举手男孩，他捏着量杯沿瓶壁倒，倒完抬头看我，我朝他点头，他咧嘴笑了。第二组的女孩们往醋里滴色素，一滴不够，又加一滴，商量得像在配香水。

第三组的火山先喷了。小苏打落进醋里，咕嘟一声，红色泡沫涌出火山口，顺着报纸山坡淌下来。全班从座位上探起身子，整齐的惊呼压过来，接着是各组的惊呼此起彼伏。有个女孩拍着桌子喊我们组怎么还不喷，三秒后她自己那组也喷了，她喊得比谁都响。我站在讲台边，手里的粉笔从头到尾没动过。

喷发过后，教室一片狼藉：桌上是泡沫，地上是报纸屑，两座火山泡塌了。孩子们抢着擦桌子，抢着抢救自己的火山，八组的成员围着一座塌了的报纸山讨论明天怎么补。有个小组跑来找我说：老师，我们查了，是醋不够，明天能再试吗？我说能，材料柜随时开。

下课前我问他们：火山为什么喷。八个小组七种答案，有说气的，有说酸的，有说醋和小苏打吵架的。我不给标准答案，只把二氧化碳的名字写在黑板上。那节课没有一个人抄笔记，可我知道他们记住了。科学最好的样子，就是那一声压不住的惊呼，和塌了以后还想再试一次的追问。

晚上备课，我在火山那一页的铅笔字下面又添了一行：明年还这么上。窗外有风，材料柜里剩的半瓶白醋在灯下发亮。当老师第六年，我第一次觉得，那一声哇不便宜了，它是孩子们自己挣来的。

The Page in My Lesson Plan: Today We Make a Volcano Erupt

My lesson plan lay open on the volcano page, and I wrote a small line in pencil beside it: this time no demonstration, they do it themselves. In my sixth year teaching science, in past years I had always made the volcano erupt on the podium for them to watch. The bubbles rose, the students went wow, and then they opened the

textbook. I felt that wow came too cheap, came easy, and was forgotten just as fast.

A week before the experiment, I split the class into eight groups and gave each a roll of newspaper, a bottle of paste, and an empty bottle. The task sheet read: first build a volcano; next class, make it erupt. The class representative asked worriedly: teacher, will it make the classroom dirty? I said: yes, very dirty. His eyes lit up.

That week, eight crooked volcanoes lined the back wall of the classroom. Some slopes were pasted so thick they looked like steamed buns; some craters were cut too wide, like bowls. Not one was beautiful, and every one was made by their own hands. I looked at them from the corridor, like looking at a row of children waiting for a meal.

On experiment day, standing at the side of the podium, I only handed out materials: white vinegar, baking soda, dish soap, food coloring, measuring cups, trays. I gave no steps; the steps were on the task sheet. In the first group, the one who poured the vinegar was a boy who never raised his hand in class. He held the cup and poured along the inner wall, then looked up at me. I nodded, and he grinned. In the second group, the girls dropped coloring into the vinegar, one drop not enough, another drop added, consulting like perfumers.

The third group's volcano erupted first. The baking soda fell into the vinegar with a gurgle, red foam surged out of the crater, and ran down the newspaper slope. The whole class rose from their seats, a unified gasp rolling over, then each group's shouts rising one after another. A girl banged the table demanding why her group had not erupted yet; three seconds later theirs did, and she shouted louder than anyone. I stood by the podium and never once moved the chalk in my hand.

After the eruptions, the classroom was a wreck: foam on the desks, paper scraps on the floor, two volcanoes soaked flat. The children fought over wiping the tables, fought to rescue their volcanoes, and group eight crowded around a collapsed paper mountain debating how to repair it tomorrow. One group ran up and asked: teacher, we looked it up, it was not enough vinegar, can we try again tomorrow? I said yes, the supply cabinet is always open.

Before the bell I asked them: why does a volcano erupt? Eight groups gave seven answers: gas, acid, the vinegar and the baking soda fighting. I gave no standard answer and only wrote the word carbon dioxide on the blackboard. Not one person took notes that class, yet I know they remembered. The best face of science is that gasp you cannot hold back, and the question asked after collapse: can we try once more.

That evening while preparing lessons, I added another line under the pencil note on the volcano page: do it this way again next year. Outside the window the wind blew; the half bottle of leftover white vinegar in the supply cabinet gleamed under

the lamp. In my sixth year teaching, I felt for the first time that the wow was no longer cheap. The children had earned it themselves.