苹果为什么会变色

周六下午，乐乐想给妈妈一个惊喜。他搬来小板凳站在上面，从果盘里挑了一个最大的苹果，拿起水果刀，咔嚓切成两半。他打算切好了端给妈妈，自己去写作业。可是作业写到一半，他想起苹果还放在桌上，跑去看，咦，苹果怎么变色了。

刚才还是奶白色的果肉，现在蒙了一层淡淡的褐色，像谁在上面哈了一口气。乐乐吓坏了，心想苹果是不是坏了，是不是中了毒。他用手指戳戳，褐色的地方软软的，还渗出一点点汁。他站在桌边，端着苹果不敢动，也不知道该扔还是该留。

妈妈从厨房出来，看见乐乐紧张的样子，笑了。她接过苹果看了看，说别怕，苹果没坏，它只是变色了。乐乐问，好好的苹果为什么会变色。妈妈说，苹果果肉里有一种小东西，叫氧化酶，苹果被切开，果肉碰到了空气，氧化酶跟空气里的氧气抱在一起，果肉就慢慢变成褐色了。乐乐问，那为什么没切开的苹果不变色。妈妈把苹果转了个面，指着没切开的皮说，因为皮把果肉护在里面，空气进不去呀。

乐乐还是有点担心，变色了还能吃吗。妈妈说，能吃，就是不太好看。要不我们做个实验。她拿来三个小碟子，切了三片新苹果。第一片什么都不放，第二片抹了一点盐水，第三片挤了几滴柠檬汁。三片排成一排，等了一个小时，第一片褐了，第二片只褐了一点点，第三片还是白白的。乐乐拍起手来，说柠檬汁把氧气挡在外面了。妈妈说，对，柠檬汁里的东西让氧化酶干不了活。

那天晚上，乐乐把三片苹果的事讲给爸爸听，讲得比妈妈还详细，最后宣布自己发现了苹果的秘密。爸爸故意问，那明天苹果还变色吗。乐乐说变，但他不怕了，他还知道办法，盐水、柠檬汁，或者把切好的苹果扣上小盘子，不让空气进去。

后来乐乐在自然课上举手，讲了苹果变色的道理，老师夸他讲得清楚。放学路上他跟妈妈说，原来厨房里也藏着科学。妈妈笑着点头。从那天起，乐乐家切开的苹果再也没褐过，因为每次都是他负责挤柠檬汁。他觉得自己是家里的小小科学家。

Why Did the Apple Turn Brown

On Saturday afternoon Lele wanted to surprise his mother. He dragged over a small stool, stood on it, chose the biggest apple from the fruit plate, took up the fruit knife, and sliced it cleanly in half. He planned to carry it to his mother and then go do his homework. Halfway through his homework, he remembered the apple still on the table, ran to look, and hey, the apple had changed color.

The flesh had been milky white just now; now it wore a thin layer of brown, as if someone had breathed on it. Lele was frightened. Was the apple spoiled? Was it poisoned? He poked it with his finger; the brown part was soft and gave out a little juice. He stood at the table holding the apple, not daring to move, not knowing

whether to throw it away or keep it.

His mother came out of the kitchen, saw how tense he was, and laughed. She took the apple, looked it over, and said, do not be afraid, the apple is fine, it has only changed color. Lele asked why a perfectly good apple changes color. His mother said that inside the flesh lives a tiny thing called an oxidizing enzyme. When the apple is cut and the flesh meets the air, the enzyme hugs the oxygen in the air, and the flesh slowly turns brown. Lele asked why an uncut apple does not change. His mother turned the apple over and pointed at the unbroken skin, because the skin guards the flesh inside, so the air cannot get in.

Lele was still a little worried. If it changed color, could it still be eaten. His mother said yes, it just does not look pretty. How about we run an experiment. She brought three small dishes and cut three fresh apple slices. The first she left alone, the second she brushed with salt water, the third she squeezed a few drops of lemon juice on. The three slices lined up, and after an hour the first had gone brown, the second only slightly, and the third was still white. Lele clapped, saying the lemon juice kept the oxygen outside. His mother said right, the stuff in lemon juice stops the enzyme from doing its work.

That evening Lele told his father the story of the three slices, even more detailed than his mother, and announced that he had discovered the secret of apples. His father asked on purpose, so will apples still change color tomorrow. Lele said they will, but he is not afraid now, and he knows the tricks: salt water, lemon juice, or simply covering the cut apple with a small plate to keep the air out.

Later Lele raised his hand in science class and explained why apples turn brown, and the teacher praised him for explaining it clearly. On the way home he told his mother that science hides in the kitchen too. His mother nodded, smiling. From that day on, no cut apple in the house of Lele ever went brown, because every time it was his job to squeeze the lemon juice. He felt like the little family scientist.

朵朵的观察日记

科学老师布置了一项观察作业，观察一种变化，写观察日记。朵朵想了半天，决定观察苹果。她觉得苹果最普通，普通的东西发生变化，才最有意思。

第一天，朵朵请妈妈帮她切苹果。妈妈把苹果切成四瓣，朵朵挑了一瓣放在白瓷盘里，趴在桌上看。十分钟，瓣的边缘泛起一点点黄。半小时，黄变成了浅褐，像给苹果描了个边。两小时以后，整瓣苹果都褐了，摸上去还有点黏。朵朵在日记里写：苹果放着放着，自己给自己穿了件褐色的旧衣裳。

第二天，朵朵问妈妈，苹果为什么会自己变颜色。妈妈没有直接说答案，先问她，苹果被刀切开以后，什么地方露出来了。朵朵说果肉。妈妈说，果肉里住着一种看不见的酶，一碰到空气里的氧气，两个小家伙就闹到一块儿，果肉就褐了。这个事有个学名，叫氧化。朵朵又问，那整个的苹果为什么不褐。妈妈拿起一整个苹果举到她眼前：你看，皮在值班呢。

第三天，朵朵给日记加了对比。她切了三瓣苹果，一瓣泡在凉白开里，一瓣抹了盐水，一瓣泡在柠檬水里。中午看，泡清水的褐得最快，盐水的那瓣只褐了一圈，柠檬水里的还是白的。朵朵在日记里画了三个小苹果，给它们标上名次：柠檬水第一，盐水第二，清水第三。她在旁边写了一句：原来空气是个调皮鬼，盐水柠檬水能把它拦在门外。

第四天，朵朵把日记念给全班听。念完，有同学举手问，褐了的苹果到底能不能吃。朵朵说能，她昨天把褐的那瓣吃了，就是味道差一点。全班笑。老师让朵朵给这组观察起个名字，朵朵想了想说，就叫苹果穿衣裳。

周末，朵朵的日记本上多了妈妈写的一行字：会观察的孩子，眼睛像放大镜。朵朵把这一行看了三遍，然后翻开新的一页，写下新的题目：橘子皮里的小喷泉。她打算先自己猜，猜不出再去问妈妈。

后来朵朵养成了一个习惯，家里每次切苹果，她都抢着用柠檬汁抹一遍。妈妈问她是怕浪费实验成果吗。朵朵摇头，说她是在帮苹果值班，不让调皮鬼空气进去捣乱。她说这话的时候特别认真，像在宣布一件顶顶重要的大事。

The Observation Diary of Duoduo

The science teacher assigned an observation project: watch one kind of change and keep an observation diary. Duoduo thought for a long time and decided to observe apples. She felt apples were the most ordinary things of all, and it is the ordinary things that become most interesting when they change.

On the first day Duoduo asked her mother to help her cut an apple. Her mother cut it into quarters, and Duoduo chose one quarter and set it on a white porcelain plate, leaning over the table to watch. In ten minutes the edges of the flesh took on a faint yellow. In half an hour the yellow had become light brown, like a drawn border around the apple. Two hours later the whole quarter had turned brown, and it felt a little sticky to the touch. Duoduo wrote in her diary: the apple, just sitting there, dressed itself in an old brown coat.

On the second day Duoduo asked her mother why the apple changes color by itself. Her mother did not give the answer straight away. She first asked what was exposed after the knife cut the apple. Duoduo said the flesh. Her mother said that inside the flesh lives an invisible enzyme, and the moment it meets the oxygen in the air, the two little rascals get tangled up together, and the flesh turns brown. The thing has

a school name: oxidation. Duoduo asked, then why does a whole apple not turn brown. Her mother held a whole apple up before her eyes: look, the skin is on duty.

On the third day Duoduo added a comparison to her diary. She cut three apple quarters, soaked one in plain boiled water, brushed one with salt water, and soaked one in lemon water. At noon she checked: the one in plain water browned fastest, the salted one browned only in a ring, and the one in lemon water stayed white. In her diary Duoduo drew three little apples and ranked them: lemon water first, salt water second, plain water third. Beside them she wrote one line: so the air is a mischief-maker, and salt water and lemon water can turn it away at the door.

On the fourth day Duoduo read her diary aloud to the class. When she finished, a classmate raised a hand and asked whether a browned apple can actually be eaten. Duoduo said yes, she had eaten the brown quarter from yesterday, it just tasted a little worse. The whole class laughed. The teacher asked Duoduo to give her observation series a name. Duoduo thought a moment and said, call it The Apple Gets Dressed.

On the weekend a line from her mother appeared in the diary of Duoduo: a child who observes has eyes like a magnifying glass. Duoduo read that line three times, then opened a fresh page and wrote a new title: The Little Fountain Inside an Orange Peel. This time she planned to guess by herself first, and only ask her mother if guessing failed.

After that Duoduo formed a habit: every time the family cut apples, she fought to be the one who brushed them with lemon juice. Her mother asked whether she was afraid of wasting the experiment. Duoduo shook her head and said she was helping the apple on its watch, keeping the mischief-maker air from getting in. She said it with great seriousness, as if announcing the most important business in the world.

苹果的心事

果盘里住着一个红苹果，他每天最开心的事，就是听小主人天天讲学校里的新鲜事。可是有一天，小主人拿起刀，把他切成了两半。那一刀亮亮的，一点都不疼，就是眼前忽然开阔了，他看见了自己白白嫩嫩的内心，还有点不好意思。

小主人把他放在盘子里，转身去写作业。红苹果闲着没事，跟另一半聊天。聊着聊着，他发现自己不对劲：白白的脸正在一点一点变黄，黄了又变褐，像旧照片。他慌了，心想我是不是坏了，我是不是变丑了，等会儿小主人还愿意吃我吗。另一半安慰他，别急，我也在变。两个苹果对着叹气，盘子里安静极了。

小主人的妈妈走进厨房，一眼看见了两个变褐的苹果。她咦了一声，笑了，把苹果端到水池边，用温水轻轻冲了冲，又拿一个小盘子把它们扣住。红苹果眼前一黑，心想完了，这下更没人看见我了。结果他听见小主人跑过来问，妈妈，苹果怎么褐了，是不是坏了。

妈妈说，没坏，这是氧化。红苹果竖起耳朵听。妈妈的声音像讲课本又像讲故事：苹果的肉里住着氧化酶，刀一开，肉碰着空气，氧化酶和氧气一拉手，肉就慢慢褐了，跟铁钉生锈是亲戚。褐了也能吃，就是不好看。想让苹果不变色，要么挤点柠檬汁，要么像现在这样扣上盘子，少碰空气。红苹果听得入了迷，原来他的变色不是变坏，是跟空气拉了一次手。

小主人听完，揭开小盘子看了看，说虽然褐了一点，还是他的苹果。他咬了一大口，红苹果甜得眯起眼睛。他想，原来变褐不可怕，可怕的是没人告诉你为什么。

后来红苹果的兄弟姐妹们被切开时，都不慌了。他们排着队等柠檬汁，像等一场小雨。小主人如今切完苹果总记得扣盘子，因为他妈妈说过，跟空气少拉手，就多一分白净。红苹果觉得这一家子都学了科学，连果盘都变得讲道理了。

The Secret Worry of the Apple

In the fruit plate lived a red apple, and his happiest hour each day was listening to his little owner talk about the news at school. Then one day the little owner took up the knife and cut him in half. The blade shone, and it did not hurt at all; only the world suddenly opened wide, and he saw his own white and tender heart, and felt a little shy.

The little owner set him on a plate and went off to do homework. The red apple, with nothing to do, chatted with his other half. As they talked, he noticed something wrong: his white face was turning yellow bit by bit, and the yellow was turning brown, like an old photograph. He panicked. Was he spoiled? Was he ugly now? Would the little owner still want to eat him. His other half comforted him, saying do not worry, I am changing too. The two apples sighed at each other, and the plate was very quiet.

The mother of the little owner walked into the kitchen and spotted the two browned apples at once. She said oh, and laughed, carried them to the sink, rinsed them gently with warm water, and covered them with a small plate. The world of the red apple went dark, and he thought, now nobody will ever see me. Then he heard the little owner run up and ask, mother, why did the apples go brown, are they spoiled.

His mother said they are not spoiled, this is oxidation. The red apple pricked up his ears. Her voice sounded half like a textbook and half like a story: inside apple flesh live oxidizing enzymes; when the knife opens the apple and the flesh meets the air, the enzyme and the oxygen hold hands, and the flesh slowly browns, a cousin of a

rusting nail. Browned apples can still be eaten, they just do not look pretty. If you want an apple not to change, squeeze on some lemon juice, or cover it with a plate like now, so it meets less air. The red apple listened, spellbound. So his browning was not going bad; it was just holding hands with the air once.

The little owner finished listening, lifted the small plate to look, and said brown or not, they were still his apples. He took a big bite, and the red apple squinted with sweetness. He thought: browning is not what should be feared; what should be feared is that nobody tells you why.

After that, when the brothers and sisters of the red apple were cut open, none of them panicked. They lined up waiting for the lemon juice, like waiting for a light rain. The little owner now always remembers to cover the plate after cutting, because his mother said the fewer handshakes with the air, the more whiteness stays. The red apple felt that the whole family had learned science, and even the fruit plate had become reasonable.