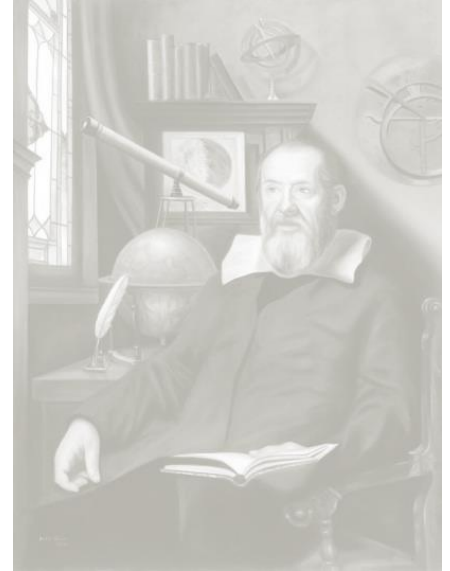


12. 伽利略的落体实验

gè wèi tóng xué
各位同学：

běn zhōu shì kē xué zhōu wǒ xī wàng dà jiā néng zài
本周是科学周，我希望大家能在
zhè ge xīng qī duō liú yì kē xué fāng miàn de kè tí
这个星期，多留意科学方面的课题，
jiā shēn duì kē xué de xìng qù rú guǒ kě yǐ jìn xíng shí
加深对科学的兴趣，如果可以进行实
yàn bìng jiā yǐ yàn zhèng nà shì zuì hǎo bú guò le zài
验并加以验证，那是最好不过了。在
cǐ wǒ xiàng dà jiā jiè shào yí wèi wēi dà de kē xué jiā
此，我向大家介绍一位伟大的科学家
——伽利略（Galileo Galilei，
1564 - 1642）。



jiā lì lüè shì yì dà lì shù xué jiā wù lǐ xué jiā hé tiān wén xué jiā
伽利略是意大利数学家、物理学家和天文学家，
tā yě shì kē xué gé mìng de xiān qū jiā lì lüè fā míng le wàng yuǎn jìng hé wēn dù
他也是科学革命的先驱。伽利略发明了望远镜和温度
jì hái cóng diào dēng zhōng dé dào qǐ fā yīn ér fā míng le bǎi zhēn tā bì shēng
计，还从吊灯中得到启发，因而发明了摆针。他毕生
wéi rén men zuò chū jù dà gòng xiàn bèi yù wéi xiàn dài kē xué zhī fù
为人们做出巨大贡献，被誉为现代科学之父。

Galileo's Free Fall Experiment

Dear students:

This week is Science Week. I hope you can pay more attention to scientific topics and show more **interest** in science this week. It would be great if you can conduct experiments and verify what you have learnt. Here, I would like to **introduce** to you a great scientist—Galileo Galilei (1564-1642).

Galileo was an Italian **mathematician, physicist, and astronomer**, and he was also a **pioneer** of the science revolution. Galileo invented the **telescope and the thermometer**. He even invented the pendulum clock that was inspired by the chandelier. He made great contributions all his life and is known as the father of **modern science**.

tā shì lì shǐ shàng dì yī wèi zài kē xué shí yàn jī chǔ shàng róng huì shù xué wù lǐ
他是历史上第一位在科学实验基础上融汇数学、物理
xué hé tiān wén xué sān fāng miàn zhī shì de kē xué jiā tā yǐ shí yàn gǎi biàn le rén men yǐ
学和天文学三方面知识的科学家。他以实验改变了人们以
wǎn cuò wù de xiǎng fǎ shì jìn dài kē xué shí yàn de chàng dǎo zhě zhī yī
往错误的想法，是近代科学实验的倡导者之一。

jiā lì lüè bú dàn qīn zì shè jì hé yǎn shì guò xǔ duō shí yàn ér qiě hái qīn zì
伽利略不但亲自设计和演示过许多实验，而且还亲自
yán zhì chū bù shǎo shí yàn yí qì tā de gōng yì zhī shì fēng fù zhì zuò jì shù jīng xì
研制出不少实验仪器。他的工艺知识丰富，制作技术精细，
tā suǒ chuàng zhì de xǔ duō shí yàn yí qì zài dāng shí jí duì hòu shì dōu hěn yǒu yǐng xiǎng
他所创制的许多实验仪器在当时及对后世都很有影响。

jiā lì lüè èr shí wǔ suì nà nián yǐ jīng dān rèn shù xué jiào shòu tā wèi le yán
伽利略二十五岁那年，已经担任数学教授。他为了研
jiū dì qiú de zhòng lì jué dìng yào dào gāo chù zuò yí xiàng gōng kāi shí yàn zhè ge xiāo
究地球的重力，决定要到高处做一项公开实验。这个消
xi bù jiǔ hòu jiù chuán kāi le
息不久后就传开了。

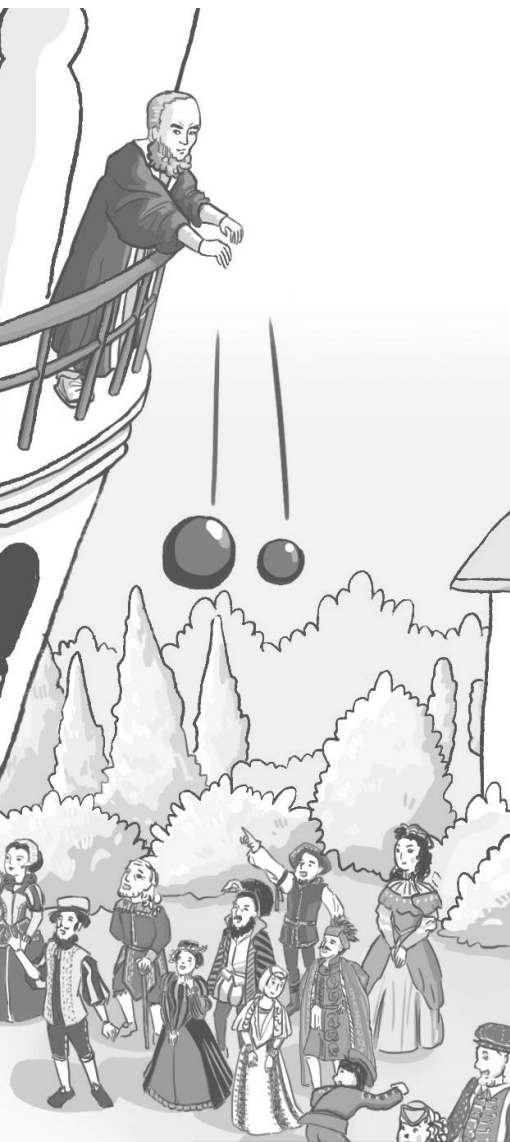
gè wèi qǐng jù jí zài bǐ sà xié tǎ děng huì er jiāng fā shēng yǒu qù yòu hǎo
“各位，请聚集在比萨斜塔，等会儿将发生有趣又好
kàn de shì qing jiā lì lüè mǎn huái xīn xīn de shuō
看的事情！”伽利略满怀信心地说。

He was the first scientist in history to **integrate/combine** the knowledge of mathematics, physics and astronomy on the basis of scientific experiments. He used experiments to correct people's wrong ideas, and he is one of the **advocates** of modern scientific experiments.

Galileo not only personally **designed and demonstrated** many experiments, but also personally developed many science **apparatus/equipment**. He was a talented craftsman and produced fine apparatus for experiments. Many of these apparatus were not only influential at that time, but also in many later generations.

When Galileo was twenty-five years old, he was already a professor of mathematics. To study the gravity of the earth, he decided to do a public experiment from a high place. The news spread soon after.

"Everyone, please gather at the Leaning Tower of Pisa, interesting and wonderful things will happen later!" Galileo said with **full confidence**.



shōu dào xiāo xī de rén dōu jù jí zài xié tǎ fù
收到消息的人，都聚集在斜塔附
jìn zhǔn bèi dà bǎo yǎn fú jiā lì lüè hé xué shēng men
近，准备大饱眼福。伽利略和学生们
dài zhe yí dà yí xiǎo de liǎng kē tiě qiú cháo zhe tǎ dǐng
带着一大一小的两颗铁球，朝着塔顶
yí bù yí bù de zǒu shàng qù yào bǎ qiú wǎng xià diū
一步一步地走上去，要把球往下丢。

lǎo shī zhè shí yàn zhǐ yào suí biàn zuò yí zuò
“老师，这实验只要随便做一做，
yě zhī dào dāng rán shì yòu dà yòu zhòng de qiú huì xiān diào dào
也知道当然是又大又重的球会先掉到
dì shàng jiā lì lüè de xué shēng men bù xiāng xìn tā de
地上。”伽利略的学生们不相信他的
shí yàn huì chéng gōng
实验会成功。

kě shì jiā lì lüè bù yǐ wéi rán jiān
可是，伽利略不以为然，坚
chí yào zuò shí yàn xué shēng men mǎn fù hú yí cóng bǐ
持要做实验，学生们满腹狐疑。从比

sà xié tǎ xià fāng wǎng shàng kàn de guān zhòng men yě hěn yí
萨斜塔下方往上看观众们也很疑
huò jiā lì lüè jū rán shuō dà qiú hé xiǎo qiú huì
惑：伽利略居然说大球和小球会
tóng shí diào dào dì miàn shàng dà jiā dōu wú fǎ liǎo
同时掉到地面上！大家都无法了
jiě wèi shén me jiā lì lüè zuò zhè zhǒng wú liáo de shí yàn
解，为什么伽利略做这种无聊的实验。

Those who received the news gathered near the leaning tower, ready to feast their eyes. Galileo and the students took two iron balls, one big and one small, and walked up step by step towards the top of the tower to throw the balls down.

“Teacher, this is a trivial experiment, you know that of course it is a big and heavy ball that will fall to the ground first.” Galileo's students did not believe that his experiment would succeed.

However, Galileo disagreed and insisted on doing experiments, and the students were full of suspicion. The audience looking up from below the Leaning Tower of Pisa was also puzzled: Galileo claimed that the big and small balls would fall to the ground at the same time! No one can understand why would Galileo do such a useless experiment.

“一、二、三！”终于，两颗球往下坠，但奇怪的是，落地声只响起一次，因为大球和小球竟然同时掉到地面。

这真是超出想象。本来想看好戏的旁观者都吓了一跳，伽利略的学生们也同样十分讶异。从来就没有一名科学家能推想出这样的结果。

“老师，您怎么知道两颗球会同时掉到地面上呢？”学生们纷纷请教。

“我只是根据公式看出，在地面上空同一高度的两个物体，不管物体的质量、大小、结构、密度如何，它们获得的重力加速度都是完全相同的。不过，实验才是最好的证据，不管什么事情，都不能不做实验而轻易地做出判断。”伽利略没有得意，只有求证成功的喜悦啊！

希望同学们能够以伽利略为榜样，对事物多多思考。不过，进行实验之余，千万别忘了安全第一。

“One, two, three!” Finally, two balls were dropped, but strangely, there was only a single sound of the balls landing, because the big and the small balls both hit the ground at the same time.

This was beyond imagination. The onlookers were taken aback, and Galileo's students were also surprised. No scientist has such a hypothesis.

“Teacher, how do you know that two balls will fall to the ground at the same time?” The students asked one after another.

“I just see from the formula that two objects at the same distance above the ground, regardless of the mass and size of the object, the structure and density, they get the same amount of gravitational pull and thus have the same falling speed. Nevertheless, experiments are still the best evidence. No matter what happens, you can't make conclusions without first doing experiments.” Galileo was not arrogant, but felt happy for successfully proving something!

I hope that everyone can follow Galileo's example and have a critical view on everything. However, besides conducting experiments, don't forget safety is always first.