曼哈顿计划 The Manhattan Project

Hello. This is 6 Minute English from BBC Learning English. I'm Sam. And hello I'm Rob.

大家好。这里是 BBC 学习英语栏目的六分钟英语。我是萨姆。我是罗布。

On August the sixth 1945, the US aircraft, Enola Gay, dropped an atomic bomb on the city of Hiroshima, instantly killing 70,000 people.

1945年8月6日，美国艾诺拉·盖号飞机在广岛市投下一颗原子弹，当场造成7万人死亡。

When Japan refused to surrender, a second bomb was dropped on Nagasaki three days later.

日本拒绝投降的三天后，美国在长崎投下了第二颗原子弹。

Many believe the bombings quickened the end of the Second World War.

许多人认为，这两颗原子弹加速了第二次世界大战的结束。

But it came at a terrible human cost, which some have called a crime against humanity.

但人类为此付出了惨痛的代价，有人称之为反人类罪。

The invention of the atomic bomb, which resulted from the cooperation between the US military and some of the world's leading scientific minds, was known as The Manhattan Project.

原子弹的发明是美国军方和一些世界级的科学家合作的结果，被称为曼哈顿计划。

In this programme we'll take a look into the science and the politics of The Manhattan Project, and as usual, we'll learn some new vocabulary as well.

在本期节目中，我们将从科学和政治的角度讨论曼哈顿计划，像往常一样，我们也会学习一些新的词汇。

Even before World War Two, scientists had known about the potential energy inside uranium, the heaviest metal in the periodic table, a diagram which groups the chemical elements into rows and columns according to their atomic number and symbol.

甚至在第二次世界大战之前，科学家们就已经知道铀内部潜藏着能量。铀是元素周期表中最重的金属。元素周期表根据化学元素的原子序数和符号将它们排成行和列。

The challenge for science was learning how to unleash this potential energy in a controlled way.

科学界面临的挑战是研究如何以可控的方式释放这种能量。

We'll hear more soon, but first I have a question for you, Rob.

我们将讨论更多，但首先我有个问题要问你，罗布。

I mentioned that uranium is the heaviest element in the periodic table, but which is the lightest?

我提到铀是元素周期表中最重的元素，那哪种元素是最轻的?

Is it a) hydrogen b) carbon or c) oxygen?

添加的词汇

是 a) 氢 b) 碳，还是 c) 氧?

Well, oxygen is a gas, so it must pretty light.

嗯，氧是一种气体，所以它一定很轻。

So I'll say c) oxygen.

所以我觉得是 c) 氧气。

OK, Rob, we'll find out the answer later in the programme.

好的，罗布，稍后我会在节目中揭晓答案。

First, let's find out a bit more about the science of uranium from Frank Close, an Oxford professor of theoretical physics, in conversation with BBC Radio 4 programme, In Our Time.

首先，让我们从牛津理论物理教授弗兰克·克洛斯那里了解更多关于铀的知识，他曾在BBC4台节目《我们的时代》中这样说。

In 1938 the discovery was made that if you use uranium, the atoms of uranium, which are the heaviest that occur naturally in the periodic table, they're very fragile, and the discovery was that if you just almost touched them with a single neutron, that's a nuclear particle, the uranium was like a drop of water, it would just break apart, split in two, and this action of splitting the uranium has become known as fission.

1938年，我们发现如果使用铀，铀原子，铀原子是天然存在的最重的原子，非常脆弱。人们发现，如果你仅仅是用一个中子轻轻触碰铀原子，（中子是一个核粒子）铀原子就会像一滴水，它会分裂，分裂成两个。这种铀原子的分裂行为被称为裂变。

Atoms of uranium are very fragile - easily broken or damaged.

铀原子非常脆弱，很容易破碎或损坏。

In 1938, it was discovered that when nuclear particles called neutrons were fired at uranium atoms, they would split, or break in two.

1938年，人们发现，当名为中子的核粒子撞到铀原子时，它们会分裂，或者说一分为二。

This process of splitting uranium, or fission, did two things.

铀原子分裂的过程中，或称裂变，发生了两件事。

First, it released huge amounts of energy, a billion times more than would be released in a normal chemical reaction.

首先，它释放出巨大的能量，比正常化学反应释放的能量多出10亿倍。

Secondly, the act of splitting atoms released two more neutrons.

其次，原子分裂的行为又释放了两个中子。

These new neutrons were freed to hit more uranium, creating four neutrons, which in turn were freed and created eight, then sixteen and so on, making what's known as a chemical chain reaction.

这两个新的中子又能撞击两个铀原子，产生四个中子，这四个中子又能产生八个中子，然后是十六个，以此类推，形成了所谓的化学链式反应。

In everyday English, a chain reaction is a series of events where each event becomes the cause of the next.

日常英语中，连锁反应是一系列事件，每个事件都会成为下一个事件的起因。

The politics behind the development of the atomic bomb was no less complex than the science.

原子弹发展的政治背景与其涉及的科学一样复杂。

In the same year that Hitler invaded Poland, two Jewish scientists exiled from Nazi Germany - Rudolf Peierls, and Otto Frish - first realised uranium's power as a weapon of war.

希特勒入侵波兰的那一年，从纳粹德国流放了两名犹太科学家即鲁道夫·佩尔斯和奥托·弗里什。他们首先意识到铀作为战争武器的威力。

Listen as Professor Frank Close takes up the story for BBC Radio 4 programme, In Our Time.

听听弗兰克·克洛斯教授在BBC广播4台节目《我们的时代》上所讲述的故事。

Now what happened at that moment was that having had the idea and the shock of the discovery, you immediately then think, "maybe scientists in Germany have already had the same idea and come to the same conclusions.

当时，他们发现了这个事情，一是很震惊，然后马上就想到，“也许德国的科学家已经想到了并得出了同样的结论。

Could Hitler already be building such a weapon?" And in their memorandum which they wrote and reached the British government they said it's conceivable that Germany is in fact developing this weapon, and the only defence against it is to have one yourself.

或许希特勒已经正在制造这样的武器了？”在他们撰写并提交给英国政府的备忘录中，他们说，可以想见，德国正在开发这种武器，而只有我们自己也开发出来这种武器，才可能抵御德国的攻击。

After their discovery, Peierls and Frish were worried that the Nazis had already found out how to weaponize uranium.

发现铀原子的威力后，佩尔斯和弗里什担心纳粹已经找到用铀制作武器的方法。

It was conceivable, or believable, that Germany was building an atomic bomb.

德国正在制造原子弹，这是可以想象的，或者说是可信的。

They shared this terrifying thought in their famous memorandum, a short written report on a specific topic.

他们在著名的备忘录中分享了这个可怕的想法。备忘录指一份围绕特定主题的简短书面报告。

As soon as US President Franklin Roosevelt read it, he started the Manhattan Project, and the race to build an atomic bomb began.

美国总统富兰克林·罗斯福一读到它，就启动了曼哈顿计划，制造原子弹的竞赛也就开始了。

In a strange twist of history, it turned out that Hitler hadn't been building atomic bombs at all.

奇怪的是，历史上希特勒根本没有制造原子弹。

And Hiroshima, the Japanese city destroyed in 1945, was rebuilt and stands as a symbol of peace today.

而1945年被摧毁的日本城市广岛得到重建，如今成为了和平的象征。

Let's end on a lighter note, Sam, with your question.

萨姆，节目最后咱们聊点轻松的吧。比如你的问题。

Yes, I asked which is the lightest element in the periodic table.

对了，我问你元素周期表中哪个元素最轻。

It's a) hydrogen, the lightest of all gases, which come at the very start of the periodic table, having the atomic number 1.

答案是 a) 氢。它是最轻的一种气体，位于元素周期表的最开始，原子序数为1。

Ah, if only I'd remembered what our chemistry teacher taught us about the periodic table, that's a chart grouping all the chemical elements according to their atomic number.

啊，要是我还记得化学老师教的元素周期表就好了。“periodic table”是一张图表，根据化学元素的原子序数给所有化学元素分了组。

Let's recap the rest of the vocabulary too.

咱们也回顾一下其他词汇吧。

If something is fragile it's easily broken.

“fragile”形容某物很容易破。

To split something means to break it into two parts.

“split”的意思是把某物一分为二。

A chain reaction happens when one event becomes the cause of the next.

“chain reaction”指一个事件成为下一个事件起因的情况。

A memorandum is a short, written report on a specific topic.

“memorandum”是围绕特定主题的简短书面报告。

And finally, the adjective conceivable means believable.

最后，形容词“conceivable”的意思是可信的。

That brings us to the end of our programme!

我们的节目到此结束啦！

We hope you'll join us again soon for more interesting issues and useful vocabulary.

本节目将讨论更多有趣的问题、讲述更多词汇。期待大家收听！

Bye for now! Bye!

再见了！再见！