

Speaker's manuscript, slide show

The 2017 Nobel Prize in Chemistry

Title slide

Now the world has found out who will receive the 2017 Nobel Prize in Chemistry.

Today you will learn more about the background of the Nobel Prize and about this year's Prize.

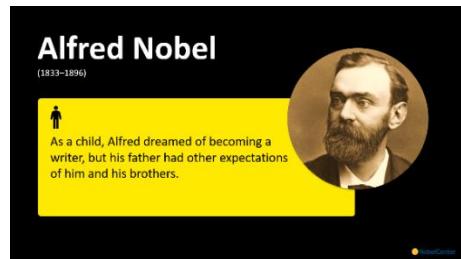


Alfred Nobel

Alfred Nobel was born in Stockholm, Sweden on October 23, 1833.

As a nine-year-old, he moved together with his older brothers and his mother to Saint Petersburg, the capital of Russia at that time. There his father Immanuel had started a factory.

In St. Petersburg, Alfred received a good education and dreamed of becoming a writer. Alfred's father made him study natural sciences and technology instead, since he and his brothers were expected to take over the family's factory.



Dynamite

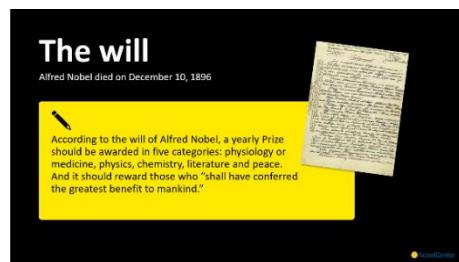
Alfred Nobel, his father and his brother Emil tried to invent an explosive that was safer than pure nitroglycerine. It was very dangerous to use nitroglycerine as an explosive – so dangerous that Alfred's brother Emil died in an explosives accident in 1864.

But Alfred finally succeeded in developing a method for producing nitroglycerine and a way to use it as an explosive. He named his invention "Dynamite" in 1867. Dynamite was a comparatively safe explosive. It was in huge demand during the period of industrialisation, since there was so much construction work. By taking out patents on many of his ideas, Alfred earned a lot of money and started many factories around the world.



The will

Alfred Nobel died of a stroke on December 10, 1896. In his will he wrote that a large part of his fortune should be placed in a fund. The yearly interest on this fund would pay for a prize given to "those who, during the preceding year, shall have conferred the greatest benefit to mankind." The interest would be divided into five equal parts, with one part awarded to "the person who shall have made the most important chemical discovery or improvement". The first Nobel Prize was awarded in 1901. Since then, more than 900 Prizes have been awarded to different people and organisations.



The will
Alfred Nobel died on December 10, 1896

According to the will of Alfred Nobel, a yearly Prize should be awarded in five categories: physiology or medicine, physics, chemistry, literature and peace. And it should reward those who "shall have conferred the greatest benefit to mankind."

The Nobel Prize Award Ceremony

On December 10 each year, the Nobel Prize is presented. This year the Prize in each category consists of a medal, a diploma and nine million Swedish kronor – or over a million US dollars.

The Prize Award Ceremony is held at Stockholm Concert Hall for all categories except the Peace Prize, which is awarded in Oslo, Norway. After the actual Award Ceremony, there is an elegant Banquet in each city to honour the new Nobel Laureates.



Prize Award Ceremony
Nobel Day, December 10 each year

The Prize consists of a medal, a diploma and a sum of money. Sweden's King Carl XVI Gustaf presents the medal and diploma to each Laureate at Stockholm Concert Hall.

The Nobel Prize in Chemistry

"...the person who shall have made the most important chemical discovery or improvement".

Over the years, the Nobel Prize in Chemistry has been awarded for discoveries and improvements that have provided us with knowledge of the structure, creation and changes in various substances – what atoms and molecules look like, how and why they react with each other, and even how we can create new molecules.



The Nobel Prize in Chemistry

This Prize rewards important discoveries or improvements that provide new knowledge about the composition of materials, how they are created and how they change due to chemical reactions.

Examples of earlier Laureates

A few examples: discovery of new radioactive elements (Marie Curie, 1911) and the structure of penicillin and insulin (Dorothy Crowfoot Hodgkin, 1964).



Examples of earlier Laureates
The Nobel Prize in Chemistry

Discovery of radioactive elements, 1911
Marie Curie

Structure of penicillin and insulin, 1964
Dorothy Crowfoot Hodgkin

The 2017 Laureates in Chemistry

The 2017 Chemistry Prize has been awarded to Jacques Dubochet, Joachim Frank and Richard Henderson "for developing cryo-electron microscopy for the high-resolution structure determination of biomolecules in solution".

Put simply, they developed new ways of using special microscopes (electron microscopes) to find out how the molecules found in all living organisms look.

Jacques Dubochet, Joachim Frank and Richard Henderson

The 2017 Nobel Prize in Chemistry

For developing cryo-electron microscopy for the high-resolution structure determination of biomolecules in solution



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Studying biomolecules

All living things contain a huge number of different types of proteins. These proteins are very important components of the body, since they form the structure of all cells, transport different substances, regulate various reactions and defend us against bacteria, viruses and more. Protein molecules are very tiny and difficult to study. Their appearance also changes if they are not in some kind of liquid. We need to know how they look to understand how they function. This year's Laureates in Chemistry have helped us do this.

Biomolecules

The important protein molecules in the body are very tiny and difficult to study. Their appearance also changes if they are not in some kind of liquid.



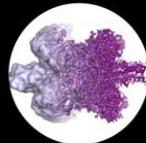
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Improved ways of using electron microscopes

The Laureates developed methods that now enable us to use electron microscopes to find out how protein molecules look. Before their discoveries, protein molecules burned up or dried out in electron microscopes. The Laureates developed a way to freeze proteins extremely fast and they used computer programmes that make it possible to take lots of two-dimensional images and merge them into sharp three-dimensional images.

The discoveries

The Laureates developed a special way to freeze proteins and a method that uses a large number of two-dimensional images to create a sharp three-dimensional image with the help of computer programmes.



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Knowledge of bioprocesses

Now that there are better ways to find out how the molecules in the body look, we can better understand how they function. This will also enable us to improve our knowledge of why they sometimes fail to function as they should, which will help us to develop new medicines. The discoveries of this year's Laureates in Chemistry have led to new methods for learning how biomolecules look, which are being used by many researchers around the world.

The benefits

Now that there are better methods for understanding how the molecules in the body function, we can also improve our knowledge of why they sometimes fail to function as they should. This will help us to develop new medicines, for example.

Knowledge leads to new advances.

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