

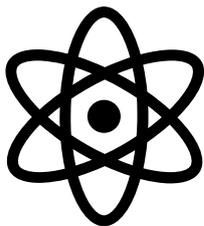
# The 2017 Nobel Prize in Physics

Since 1901 the Nobel Prize has been presented to the Laureates each December 10, but in October we learn who they are.

## Alfred Nobel and the Nobel Prize

Alfred Nobel lived between 1833 and 1896. During his lifetime he made many inventions, with the best-known being dynamite.

Alfred Nobel was thus an inventor, but also a chemist, entrepreneur and industrialist. When he died, he left behind a large fortune. In his will, Nobel declared that a large part of this money should be used to establish a prize for “those who shall have conferred the greatest benefit to mankind.” The Nobel Prize is divided into five equal parts, with the Physics Prize being one part. The Nobel Prize in Physics is awarded to a person or persons who have made important discoveries or inventions in their field.



## The Nobel Prize in Physics

Alfred had lots of different ideas. He reportedly once said, “If I come up with 300 ideas in a year, and only one of them is useful, I am satisfied.”

Many of Alfred’s ideas were about improving safety in his factories, whose core activity was production of nitroglycerine. To reduce the risk that anything might happen when transporting nitroglycerine, the production buildings were located on “hills” (artificial earthen mounds). The nitroglycerine could then run with the help of gravitation to nearby buildings for production of explosives.

Aside from developing production processes, he was also interested in new materials, including the metal called aluminium (in the US: aluminum). Late in life, Alfred built the world’s first aluminium boat.



## This year’s Physics Prize

This year’s Prize has been awarded to three people – Rainer Weiss, Barry C. Barish and Kip S. Thorne – “for decisive contributions to the LIGO detector and the observation of gravitational waves”.

Since the 1970s, the Laureates have developed a measuring instrument consisting of long tunnels that form an L. By measuring the length of the tunnels using lasers, small changes in length can be detected. These occur, among other things, due to gravitational waves. These measurements are done using multiple instruments, located more than 3,000 kilometres apart. By comparing the measurement results for these instruments, it is possible to determine what are gravitational waves and what are “false” signals caused by vibrations in the ground.

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Two black holes spiralled around each other 1.3 billion years ago, faster and faster, until they collided. These black holes had an enormous mass: about 30 times larger than the mass of the sun, which was enough to generate a measurable gravitational wave. Since then, this wave has moved through the universe. On September 14, 2015 it reached the Earth, and the Laureates’ instruments succeeded in measuring it.

The work of the Nobel Laureates will enable us to increase our knowledge of astronomical objects, such as black holes. It has also enabled us to confirm Einstein’s theory of relativity, and in the future these measurements will lead to further knowledge.

# Discussion questions



Below are a few questions about the Physics Prize and the Laureates. Think about them by yourself or discuss them in groups, as your teacher suggests.

## 1. What phenomena did the 2017 Laureates in Physics study?

Physicists try to describe different phenomena such as how planets move around a star, or how radio signals spread.

- Why do you think the 2017 Laureates studied these particular phenomena?

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## 2. What did the Laureates do?

Imagine that you are asked to explain the work of the 2017 Laureates to someone aged around 13.

- What did the Laureates do?
- What was new about it, and what were the results?

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## 3. Conferring the greatest benefit to mankind

According to Alfred Nobel's will, the Physics Prize should go to the person(s) "who shall have made the most important discovery or invention within the field of physics".

- What can this new knowledge lead to?
- Do you think it is something that will benefit you?
- Can it help other people in some way?

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