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# How Nearly Everything was Invented

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# WANTED It's

Beyond belief

1933

In 1609, Italian astronomer Galileo Galilei became the first person to view the heavens through a telescope. But he soon got into trouble when he claimed his observations showed that the Earth revolved around the Sun, contradicting the Church's belief that the Earth was at the centre of the Universe. He was thrown into jail, under threat of death, until he took it all back!

## SEEING **IS BELIEVING**

enses were probably invented in China over 1000 years ago. L They appeared in Europe in about 1270, where they were originally used in spectacles and magnifying glasses to improve vision. By the 17th century they were being incorporated into powerful new instruments designed to view objects that were either too far away or too small to see with the naked eye. Telescopes and microscopes heralded a new age in scientific research and transformed the way we see our world and the cosmos beyond.

the bigger the better

How big

1200

## Lenses

Lenses are curved pieces of glass that work by bending, or refracting, light rays passing through them. There are two types of lens: convex and concave, each of which works according to the way it bends light (see opposite). Convex lenses are used to make small objects look bigger; concave lenses make distant objects look closer (but smaller).

1674

see it?

Dutch draper Antoni van Leeuwenhoek built at

least 247 single-lens microscopes. They were so

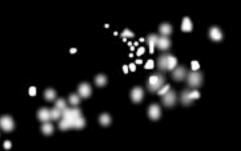
powerful that, in 1674, Leeuwenhoek became the first person to see bacteria, taken from inside his

Leeuwenhoek's microscope

own mouth

### Electron microscope

Powerful light microscopes can only magnify up to 2,000 times, and as the magnification goes up, the sharpness of the image goes down. So in 1933 German physicist Ernst Ruska invented a new kind of microscope that used an electron beam instead of light which gave much better definition. Modern electron microscopes magnify over a million times to show molecules.



## Compound microscope

1600

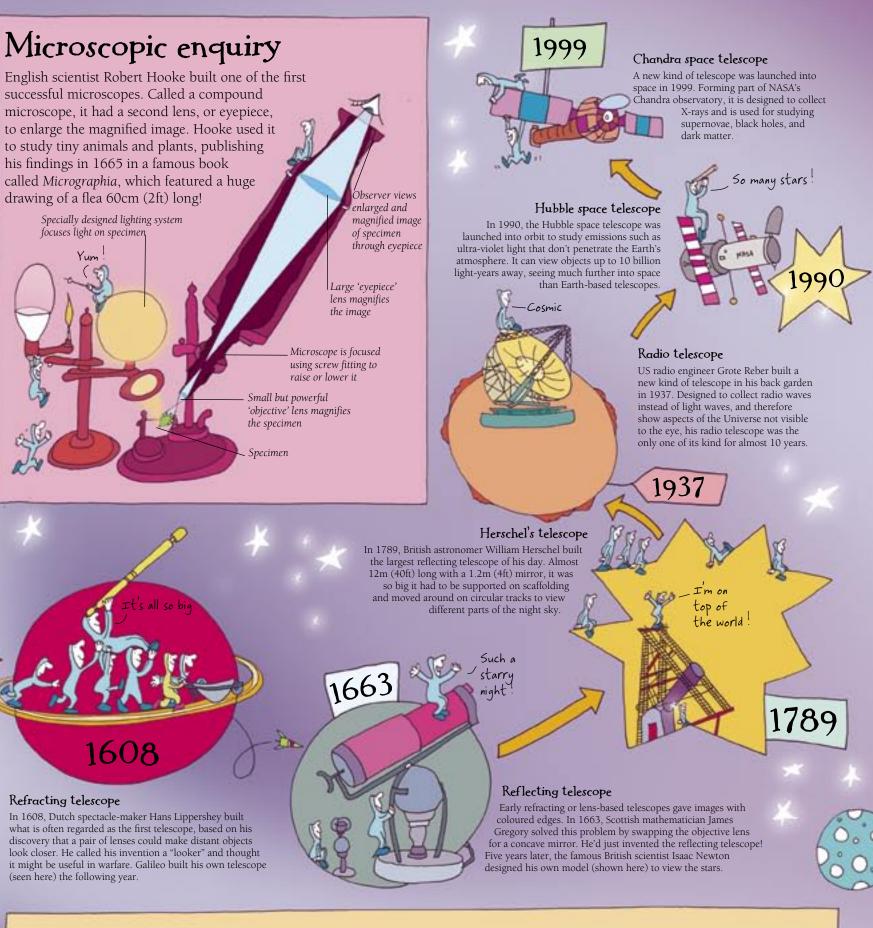
The compound microscope – that is, a microscope with two or more lenses - was probably invented by Dutch spectacle-maker Hans Janssen in about 1600.

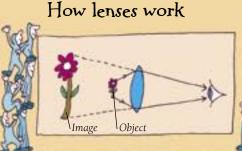
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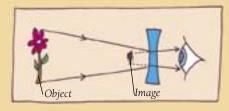




### Convex Lens

A convex, outward curved lens bends light inwards, making an object look bigger and further away than it actually is





Concave Lens

A concave, inward curved lens bends light outwards, making a distant object look smaller and closer than it actually is

