

# Forces

Mr. H. van Bemmelen

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## 1 Sir Isaac Newton

Newton was born on December 25, 1642 in Woolsthorpe, England. He went to King's School in Grantham, and went to Cambridge at Trinity College.

In the mid-1660s, a great plague occurred. The rich left the town leaving the poor and the gates of the city were locked to the sick. Cats and dogs were destroyed thinking they were spreading the disease, which reduced predation on the rats and mice. Because of this, Newton was sent to his mother's farm.

### Newton's Developments

- Light diffraction
- Prisms
- Laws of gravitation and motion
- Reflecting telescopes
- Calculus

### 1.1 After The Principia

Halle realized the comet named after him recurred every 70 years, and approached Newton asking for an explanation for it. Halle realized that Newton's physics was completely new and realized the need to publish it. It published as the Principia, and all of the proofs held within were done geometrically in the style of Euclid.

In 1663, he joined the Royal Society and became its president in 1693. He published his Optiks in 1703, right before he had a breakdown which could have been a stroke or meningitis.

In 1696 he became a sinecure for the Tower and a master in 1699, worked on the metallurgical aspects of coinage. He aggressively pursued counterfeiters and clippers, and invented milling on the edge of coins.

He spent much time in his later years on alchemy, and he may have uptook a lot of mercury or lead. He died in 1727 due to a kidney stone infection.

## 2 Forces ( $\vec{F}$ )

In common understanding, a force is a push or pull. The effect of forces was first described by Sir Isaac Newton. He postulated 3 (4) laws of forces which remain relevant today.

### 1. Law of Intertia:

“An object moving at a constant velocity shall remain so until acted upon by an external force.”

2. The vector sum of all forces acting on an object shall effect an acceleration  $\vec{a}$  of that object which is inversely proportional to the object's mass.

$$\begin{aligned}\sum^n F_k &= m\vec{a}_{\text{observed}} \\ &= \vec{F}_{\text{net}}\end{aligned}$$

### 3. Actions / Reaction Law:

An action is a force in archaic English. Where there exists an  $\vec{F}$ , there shall also exist  $-\vec{F}$  an equal and opposite force.

Huh? Why then does anything move?