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| **Isaac Newton**  **Born January 4, 1643 – Died March 31, 1727**  Isaac Newton was born on January 4, 1643, too soon before his due date. After his father died and his mother moved away, he grew up with his grandparents on a farm. As a child, he didn’t have many friends. He amused himself by thinking about the world around him. At school, Newton didn’t play much with other students. Instead, he made wooden models, kites, sundials, and even a water clock. When he was 15, his mother took him out of school to become a farmer. But the director of his school recognized his genius and convinced his mother to let him return to school. Newton went Cambridge University from 1661 to 1665. He then moved back to his grandparents’ farm for two years. During this time, he proved that “white” light was made up of all colors. He also started to figure out calculus and **universal gravitation**. He did all this before he was 24 years old.  Early discoveries  At his grandparents’ farm, Newton sat under the famous apple tree and watched an apple fall to the ground.  He wondered if the force that pulled the apple to the ground could extend out to the Moon and keep it in its orbit around Earth. Perhaps that force extended throughout the whole Universe. Newton became a professor of mathematics at Cambridge. His lectures bored many of his students, but he didn’t care. He continued his own think­ing and experiments. Later, he became the president of the top organization of scientists in England.  Laws of motion and gravity  Newton’s most important book was written in Latin and published in 1687. Its English title was *Mathematical Principles of Natural Philosophy*. It was one of the most influential works in the history of science. The book explained Newton’s three Laws of Motion and the Law of Universal Gravitation. To develop his laws, Newton used advanced math. He also designed and built his own telescope to study the heavens.  Newton’s three Laws of Motion   |  |  | | --- | --- | | 0 1 | An object at rest will stay at rest unless a force is applied to it. An object in motion will stay in motion along a straight line unless an external force is applied to it. | | 0 2 | An object will accelerate if force is applied to it. The accelera­tion will happen in the direction of the force. The acceleration will be less as the object gets bigger. | | 0 3 | For every action there is always an equal and opposite reaction. |   Putting these laws together, Newton was able to state the Law of Universal Gravitation: the gravitational pull between two objects decreases as the objects get farther apart. Newton’s Universe was a powerful idea because it said that all objects move according to rational principles. Everything, from apples to planets, obeys the same unchanging laws. By combining **physics**, mathematics, and **astronomy**, Newton made a giant leap in human understanding of Earth and the cosmos – we are not the center of the universe, but just one of many solar systems and galaxies. |

**Vocabulary Word Bank**

**Universal Gravitation (Gravity):** The fundamental force of attraction between any two objects that have mass.

**Physics:** Science that studies the nature and properties of matter and energy.

**Astronomy**: Science that studies space, stars, and planets.

