Optional: The definition and philosophy of force

Although used for centuries, there is **no** accepted **definition of force**.[2] Forces are somewhat abstract and mysterious and are usually deduced from motion (not the other way around). For example, Hooke and Newton deduced the inverse square law for gravity by observing the motion of planets. It seems forces are independent of reference frame which provides one inconclusive indication that $\vec{\mathbf{F}} = m\,\vec{\mathbf{a}}$ is not a definition of force, but instead a relationship between two independent quantities (i.e., $\vec{\mathbf{F}}$ and $m\,\vec{\mathbf{a}}$). For example, gravity forces $\frac{G\,m_1\,m_2}{r^2}$ and spring forces such as $k{*}stretch$ do not depend on a reference frame.

"***What is a force?***". Answers from science and engineering students worldwide.

A force can cause or prevent motion.	A force causes rotation and is related to moments.
A force is defined as mass $*$ acceleration.	A force is related to stress (pressure and shear) and area.
A force imparts and changes momentum.	A force is attractive or repulsive (compressive or tensile).
A force has an equal and opposite force.	A force can be created by gravity or electrical current.
A force is related to impulse and time.	A force is a directed transfer of energy (can create or remove energy).
A force applied over a distance does work.	"Force be with you."
A force is a "push or a pull" with magnitude, direction, and point of application.	
A force is a measure of the interaction between objects – from their physical properties (mass, charge, energy, etc).	
A force is a useful figment of human imagination (forces are things to make equations match reality).	

Note: Language, history, and etymology of "***force***" at **www.MotionGenesis.com** ⇒ **Textbooks** ⇒ **Resources**.

Optional: Just for fun. History, and etymology of force.

Each English word below contain the Latin phrase ***Fortis*** ("strong").

Word	Description
	From circa 1300 French and Latin (now English) word for strong place.
	From circa 1375 French and Latin (now English) word for "body of armed men".
	Italian musical word meaning strong or loud (opposite of pianissimo).
	English word for strength or talent, e.g., science and math were Euler's _____.
	Spanish word for strong.
	To help, encourage, support, and strengthen another person.
	Word introduced in 1832 meaning "quilted blanket".
	Many cereals are said to _____ with vitamins and minerals.
	Related to stomach strengths or guts.
	Police _____ the law.
	Swimming upstream requires significant _____.
	Similar to "Goodbye" (God be with ye). Yoda to Luke Skywalker in Star Wars.
	The $\vec{\mathbf{F}}$ in $\vec{\mathbf{F}} = m\,\vec{\mathbf{a}}$.

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[2] It is not uncommon in mathematics and science for quantities to first be ***used***, then ***explored***, and finally ***defined***.