

Title	Gravitational force by nearby Earth	
Ingredients	Sketch	
	At/Through	
	Owner	
	Quantity	
	Variable	
	Giver	
Recipe	Diagram the relationship	
	Graphically present quantities	
	Mathematical relationship	

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Title: Gravitational force by nearby Earth

The top half of this sheet consists of an **“Ingredients”** section with a row labeled “Sketch”, a row labeled “At/Through”, a row labeled “Owner”, a row labeled “Quantity”, a row labeled “Variable”, and a row labeled “Giver.”

Sketch: Block with labeled gravitational mass $m\text{-sub-G}$ is above, but near, Earth’s surface. Under Earth’s surface is the label “Earth”. The block is surrounded by a dashed bubble.

Remaining rows of Ingredients section are used for a flowchart illustrating the following: At time t and Near Earth’s Surface, Owners “System” and “Environment” both exist. System is owning Quantity Gravitational mass denoted by Variable $m\text{-sub-G}$. System also receives Quantity Gravitational force denoted by Variable $F\text{-vector-sub-G,E-on-sys}$, which is given by Giver Earth. Near Earth’s Surface, Owner Environment receives Quantity Gravitational acceleration, denoted by Variable g , given by Giver Earth.

The bottom half of this sheet consists of a **“Recipe”** section with a row labeled “Diagram the relationship”, a row labeled “Graphically present quantities”, and a row labeled “Mathematical relationship”.

Diagram the relationship

Flowchart arrows show that gravitational mass $m\text{-sub-G}$ contributes to gravitational-force strength $F\text{-sub-G,E-on-sys}$ and that gravitational acceleration g also contributes to gravitational-force strength.

Graphically present quantities

Title: Force diagram

Dot represents system. Gravitational force arrow originates from dot, points down, and is labeled $F\text{-sub-G,E-on-sys}$. Downward direction of gravitational force arrow is emphasized by a caption that reads, “directed toward Earth’s center”, with an arrow pointing from the caption to the tip of the gravitational-force arrow.

Mathematical relationship

$F\text{-sub-G,E-on-sys} = m\text{-sub-G times } g$

Direction of $F\text{-vector-sub-G,E-on-sys} = \text{Down}$