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In physics, a **force** is any interaction that will change the motion of an object. A force can cause an object with mass to change its **velocity** (which includes to begin moving from a **state of rest**), **i.e.**, to **accelerate**. Force can also be described as a push or a pull acting upon an object as a result of its interaction with another object. A variety of force types were placed into two broad categories on the basis of whether the force resulted from the contact or **non-contact** of the two **interacting** objects.

The contact forces are those types of forces that result when the two interacting objects are perceived to be *physically* **contacting** each other. Examples of contact forces include *frictional* forces, *tensional* forces, *normal* forces, *air resistance* forces, and *applied* forces.

The second category is known as action-at-a-distance forces. These are forces that result even when the two interacting objects are not in physical contact with each other. Yet, are able to exert a push or pull **despite** their physical separation. Examples of action-at-a-distance forces include *gravitational* forces. For example, even when your feet leave the earth and you are no longer in physical contact with it, there is a gravitational pull between you and the Earth. *Magnetic* forces also belong to the action-at-a-distance forces. For example, two magnets can exert a magnetic pull on each other even when separated by a distance of a few centimeters.

Force is a quantity that is measured using the **SI** unit known as the **Newton**. A Newton is abbreviated by an "N". To say "10.0 N" means 10.0 Newton of force. One Newton is the amount of force required to give a 1-kg **mass** an **acceleration** of 1 m/s². Thus, the following unit equivalency can be stated:

$$1 \text{ Newton} = 1 \text{ kg} \cdot \text{m/s}^2$$

The commonly known **force of gravity** is the force with which the earth, the moon, or other massively large object attracts another object towards itself. All objects upon earth experience a force of gravity that is directed downward towards the center of the earth. It is represented by the symbol **F_{grav}**. The force of gravity on earth is always found by the equation:

$$F_{\text{grav}} = m \cdot g$$

Where: **g = 9.8 N/kg (on Earth)**

and **m = mass (in kg)**

Before reading:

- 1.** How many paragraphs does the text consist of?
- 2.** Read the first sentence of the text and try to guess the ideas that will be discussed further in the text

While reading:

- 3.** Extract the difficult words from each paragraph and say if they are technical or non-technical terms.
- 4.** Using your dictionary, find the meaning of the words you have extracted in addition to the words that are underlined in each paragraph.

After reading:

- 5.** Give a suitable title to the text.
- 6.** According to you, what are the most important ideas included in the text? (find at least 03 ideas)
- 7.** Find in the text words that have the same meaning as:
 - a. Drag
 - b. Movement
 - c. Apply
- 8.** Complete the table below by the appropriate type of force from the following list:
 - a) Frictional force
 - b) Tension force
 - c) Electrical force
 - d) Normal Force
 - e) Gravitational force
 - f) Applied force
 - g) Magnetic force
 - h) Spring force
 - i) Air resistance force

Contact Forces	Action-at-a-Distance Forces
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9. Fill in the blanks with the right answer:

- The ___ is a type of frictional force that acts upon objects as they travel through the air. The ___ is often observed to oppose the motion of an object.
 - a. Magnetic force
 - b. Air resistance force
 - c. Spring force

- An ___ is a force that is applied to an object by a person or another object. If a person is pushing a desk across the room, then there is an _____ acting upon the object.
 - a. Gravitational force
 - b. Normal force
 - c. Applied force

- The ___ is the support force exerted upon an object that is in contact with another stable object. For example, if a book is resting upon a surface, then the surface is exerting an upward force upon the book in order to support the weight of the book.
 - a. Gravitational force
 - b. Normal force
 - c. Applied force

10. Are these statements: true, false, or not mentioned?

- a) The air resistance is a special type of frictional force that acts upon objects as they travel through the air.
- b) On Earth, gravity gives weight to physical objects.

11. Answer the following questions:

- What is a Newton?
- What are some daily life examples of contact forces? (at least one example)
- What is SI? What are SI base units?