

**Learning Outcome:** 1-What is motion? 2-What are forces? 3-What is acceleration?

**The Big Idea:** What makes objects move? Force can make objects move, change shape or change their speed. Page 385.

**Look & Wonder:**

- 1- By comparing it to the landscape, seeing its position change on the race track.

**Essential question:** By change their position. Page 361

**The Lesson page 364 - 368**

**What is motion الحركة ?** An object is in motion if its location is constantly changing. يكون الجسم في حركة اذا موقعه يتغير.

**Position الموقع** **Position** is the location of an object. موقع مكان الجسم

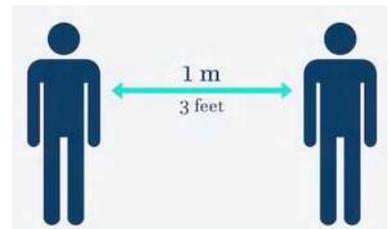
Words such as left and right, above and below, and east and west give clues about position. The objects used for comparing are called the **frame of reference**.

الأجسام المستخدمة لعمل المقارنات: مناط الاسناد

Another way to talk about position is to describe distance.

**Distance المسافة** means how far apart two points or places are. We can give distance as a measurement.

For instance, Dubai is about 150 km from Abu Dhabi.



**Speed السرعة** All moving objects have speed. **Speed** is the distance an object moves in an amount of time.

**How can you find the speed of an object?**

**First**, find **distance** the object moved. **Next** find **Time**.

Then: **Speed = Distance ÷ Time**

Example **distance = 120 km**, **Time = 1 hour** . So the Speed is  $120 \div 1 = 120 \text{ km} \setminus \text{h}$ .

**Velocity السرعة المتجهة**

Speed tells you how fast an object is moving. **Velocity** describes the object's speed and direction of motion.

<b>Speed</b> 10m\h	<b>Velocity</b> 10m\h west
<b>Move</b>	<b>Move</b>
<b>Time</b>	<b>Time</b>
<b>Distance</b>	<b>Distance</b>
	<b>Direction</b>

✓ **1- Quick Check:** p-365 An athlete moved from the east side of line to west side of line.

## What are forces? القوة

Objects do not move by themselves. You have to apply a force to make them start moving.

A **force** القوة **is a push or a pull**. **Forces can be large or small**. It takes more force to move heavy objects than light objects. **Forces** also affect an **object's speed**. **The more force you use, the faster an object will move**.

**Friction:** الاحتكاك **Friction is a force that occurs when one object rubs against another**. It pushes against moving objects and causes them to slow down.

1. **Rough surfaces:** lot of friction.
- 2- **Smooth surfaces:** less friction.
- 3-**The oil** reduces friction.

**Gravity** الجاذبية **is a pulling force between two objects**. Earth contains a lot of matter. Its gravity pulls strongly on objects near its surface. An **object's weight** is a measure of the pull of gravity on it. Scientists measure forces in SI units called **newtons (N)**.

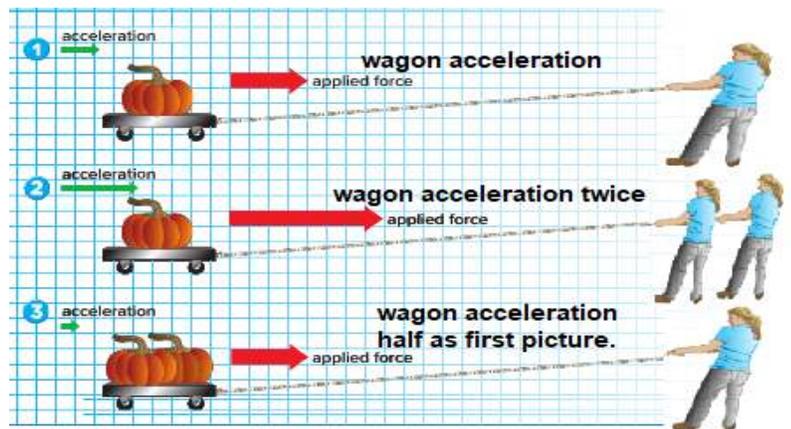
√ **2- Quick Check:** p-367 **Because mars has less mass, its gravity less than gravity of Earth.**

## What is acceleration? التسارع

**Acceleration** التسارع **is any change in the speed or direction of an object**.

**A greater force causes more acceleration**. If you apply the same force to an object with more weight, that object accelerates more slowly.

√ **2- Quick Check:** p-368 **The amount of a force affects an object's acceleration. If you apply same force to object with more weight, that object acceleration more slowly.**



### New word:

**Motion**= Movement

**Distance**= Space, Range

**Velocity** = 10m\h east

**Friction** = Rubbing

**Acceleration** = Increase in speed or rate.

**Position** = Parking\ Place

**Speed** = 10m\h 10km\h

**Force** = Push or pull

**Gravity** = pulling to Earth