تم تحميل هذا الملف من موقع المناهج الإماراتية

تجميعة صفحات الكتاب وفق الهيكل الوزاري القسم الالكتروني منهج انسباير

موقع المناهج ⇦ المناهج الإماراتية ⇦ الصف الثالث ⇦ فيزياء ⇦ الفصل الثاني ⇦ اختبارات الكترونية ⇦ الملف

تاريخ إضافة الملف على موقع المناهج: 2025-03-07 10:09:33

المزيد من مادة فيزياء:	ملفات ا كتب للمعلم ا كتب للطالب ا اختبارات الكترونية ا اختبارات ا حلول ا عروض بوربوينت ا أوراق عمل منهج انجليزي ا ملخصات وتقارير ا مذكرات وبنوك ا الامتحان النهائي ا للمدرس

التواصل الاجتماعي بحسب الصف الثالث

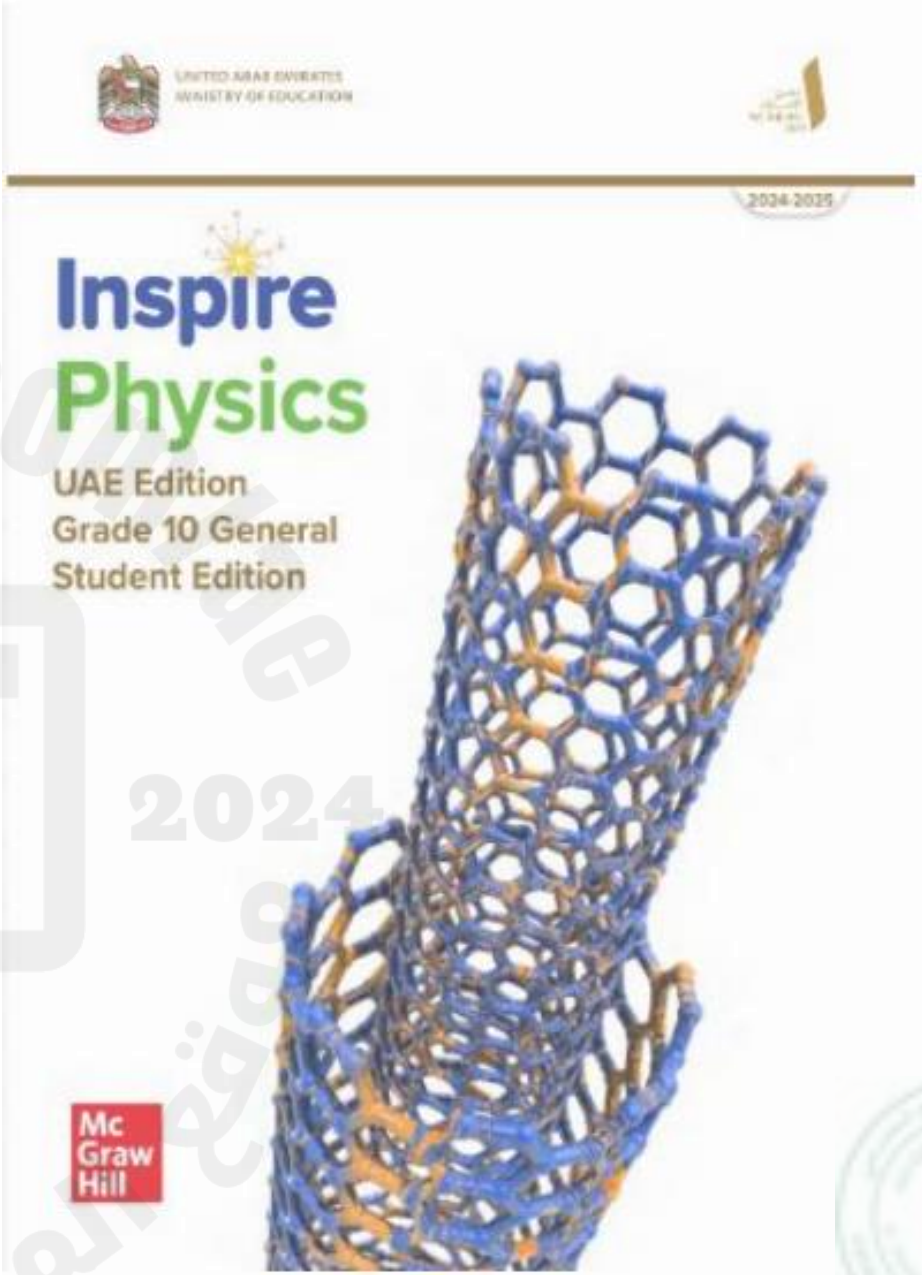
صفحة المناهج الإماراتية على فيسبوك					
المواد على تلغرام	التربية الاسلامية	اللغة العربية	اللغة الانجليزية	الرياضيات	

المزيد من الملفات بحسب الصف الثالث والمادة فيزياء في الفصل الثاني

Academic Year العام الدراسي	2025/2024
Term الفصل	2

Subject الموضوع	Physics (INSPIRE)
Grade الصف	10
Stream. المسار	General العام

Number Of MCQ عدد الأسئلة الموضوعية	15
Markes of MCQ درجة الأسئلة الموضوعية	4



1	Define force and identify the cause of all accelerations.	Student Textbook	82

Force

Consider a textbook resting on a table. To cause it to move, you could either push or pull on it. In physics, a push or a pull is called a **force.** If you push or pull harder on an object, you exert a greater force on the object. In other words, you increase the magnitude of the applied force. The direction in which the force is exerted also matters—if you push the resting book to the right, the book will start moving to the right. If you push the book to the left, it will start moving to the left. Because forces have both magnitude and direction, forces are vectors. The symbol $\boldsymbol{F}$ is vector notation that represents the size and direction of a force, while F represents only the magnitude. The magnitude of a force is measured in units called newtons (N).

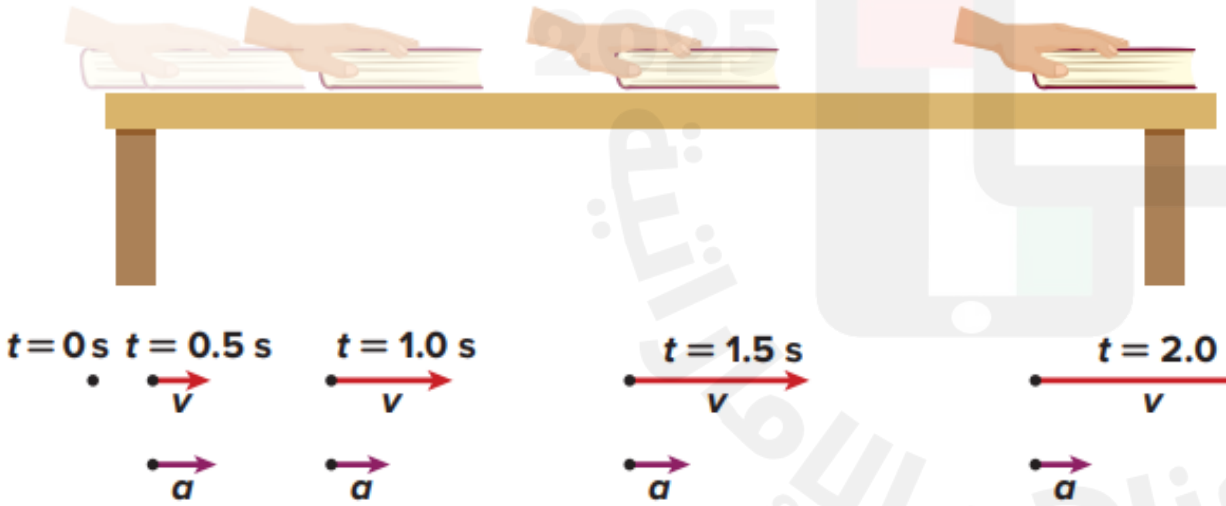
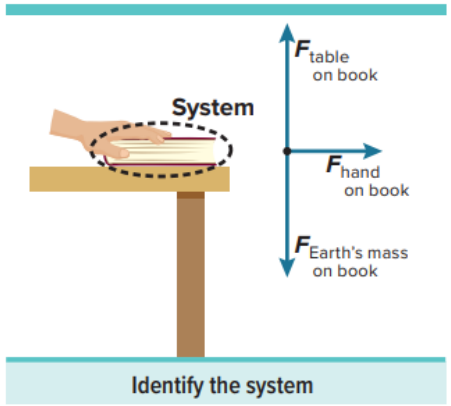
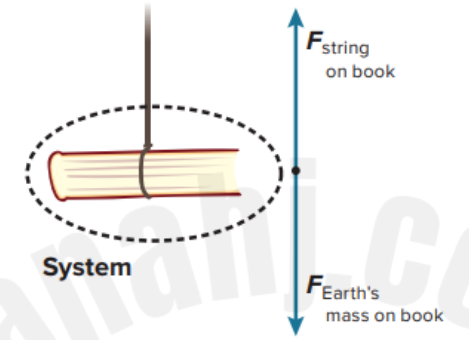


Figure 1 The hand pushing on the book exerts a force that causes the book to accelerate in the direction of the unbalanced force.

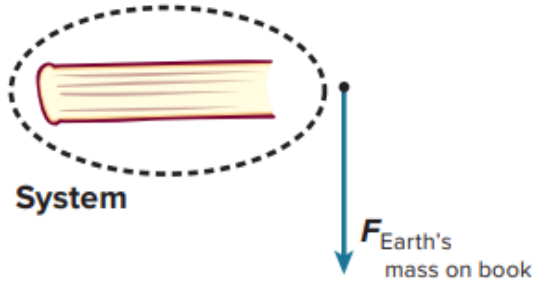
2	Classify forces as either contact forces or field forces and realize that they result from interactions caused by agents.	Student Textbook	83



Identify the system



Force exerted by string is a contact force



Force exerted by Earth's mass is a field force

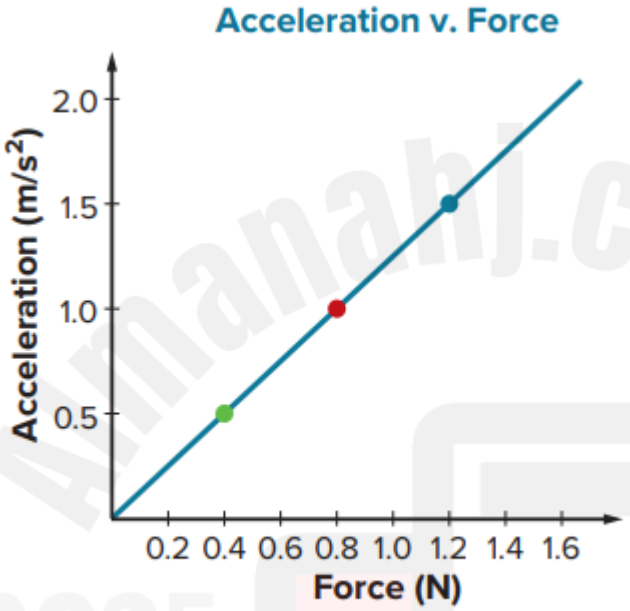
السؤال	3	5 علامات	5 marks
صنف كل مما يأتي إلى كل من قوة تلامس، قوة جاذبية أو ليس قوة.		Classify each of the following as either contact force, a field force or not a force.	

(الكتلة Mass)- (القصور inertia) - (دفع باب the push of a door)- (الاحتكاك friction)-
(مقاومة الهواء air resistance)- (قوة الزنبرك spring force) -(الجاذبية gravity)- –
(تنافر مغناطيسين magnets repulsion) - (الشد tension)- (التسارع acceleration) .

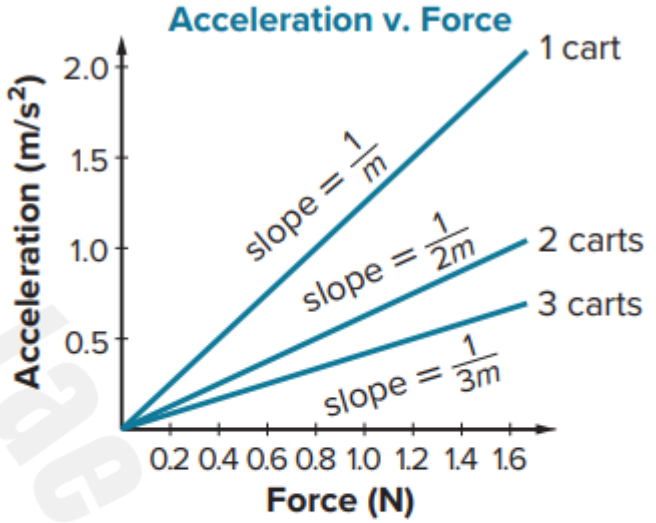
contact force قوة تلامس	field force قوة مجال	not a force ليس قوة

3	[1] Interpret the graph of net force versus acceleration. [2] Find the mass of an object from a force-acceleration graph	Student Textbook Figure 5/Figure 6	86-87

Changing the Mass of the System



Various Forces on the Same Mass



Same Force on Different Masses

Figure 6 Changing an object's mass affects that object's acceleration.

Compare *the acceleration of one cart to the acceleration of two carts for an applied force of 1 N.*

$$\textbf{Slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\textbf{Mass} = \frac{1}{Slope}$$

4	[1] Relate the direction of the acceleration to the direction of the net force. [2] State Newton's second law of motion and write it in equation form ($a=\frac{F_{net}}{m}$).	Student Textbook	88

Newton's Second Law

The acceleration of an object is equal to the sum of the forces acting on the object divided by the mass of the object.

$$a = \frac{F_{net}}{m}$$

Figure 7 The net force acting on an object is the vector sum of all the forces acting on that object.

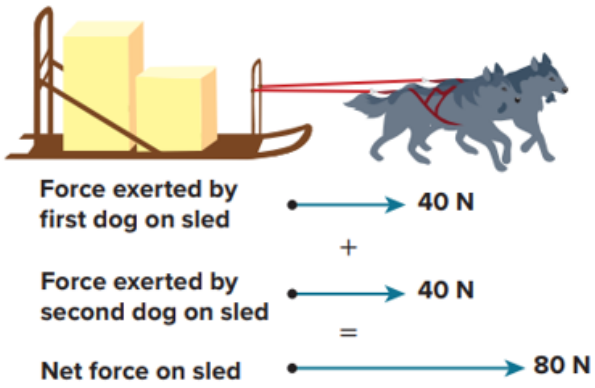
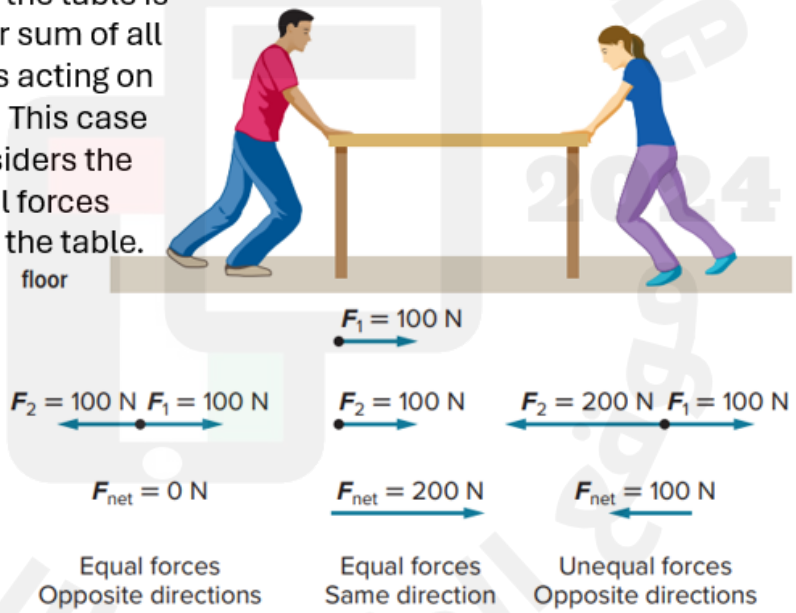
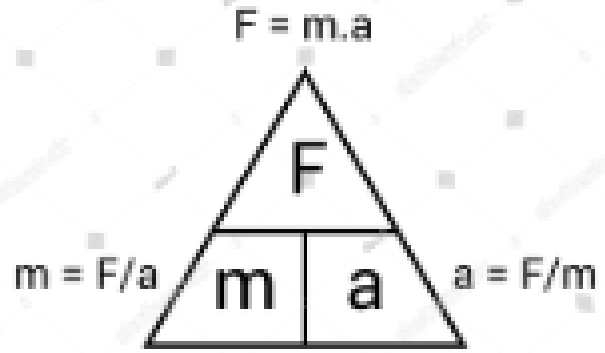
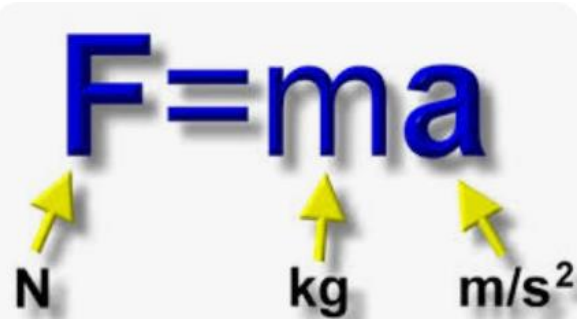


Figure 4 The net force acting on the table is the vector sum of all the forces acting on the table. This case only considers the horizontal forces acting on the table.







5	Define inertia and state Newton's First law of motion (as a law of inertia).	Student Textbook	90

Newton's First Law

"An object that is at rest will remain at rest, and an object that is moving will continue to move in a straight line with constant speed, if and only if the net force acting on that object is zero," is called Newton's first law.

Inertia

Inertia is the tendency of an object to resist changes in velocity.

- Newton's first law is sometimes called the law of inertia.
- Is inertia a force? No. Forces are results of interactions between two objects; they are not properties of single objects, so inertia cannot be a force.

6	[1] Define equilibrium. [2] State the conditions for an object to be in equilibrium.	Student Textbook	91

Figure 9 An object is in equilibrium if its velocity isn't changing. In both cases pictured here, velocity isn't changing, so the net force must be zero.

Equilibrium According to Newton's first law, a net force causes the velocity of an object to change. If the net force on an object is zero, then the object is in **equilibrium.** An object is in equilibrium if it is moving at a constant velocity. Note that being at rest is simply of the state of constant velocity, $v = 0$. Newton's first law identifies a net force as something that disturbs a state of equilibrium. Thus, if there is no net force acting on the object, then the object does not experience a change in speed or direction and is in equilibrium. **Figure 9** indicates, at least in terms of net forces, there is no difference between lying on a sofa and falling at a constant velocity while skydiving–velocity isn't changing, so the net force is zero.

Which of the following objects is **not** in equilibrium?

أي من الأجسام التالية **ليس** في حالة اتزان؟

a. ○ A car moving in a constant acceleration — سيارة تتحرك بتسارع ثابت

b. ○ A book at rest on a table — كتاب في حالة السكون على طاولة

c. ○ A box resting on an incline surface — صندوق مستقر على سطح مائل

d. ○ A train moving with a constant velocity — قطار يتحرك بسرعة ثابتة

Which of the following objects is in equilibrium? أي من الأجسام التالية في حالة اتزان؟

1.

An apple at rest on a table

2. تفاحة تستقر في حالة السكون على طاولة

3.

A box accelerating on an incline surface

4. صندوق يتسارع على سطح مائل

5.

A car moving in a constant acceleration

6. سيارة تتحرك بتسارع ثابت

7.

A train moving with a changing velocity

8. قطار يتحرك بسرعة متغيرة

7	[1] Define an object's weight. [2] Calculate the weight of an object.	Student Textbook	92
		Practice Problems (16/17)	93

Weight

An object's **weight is the gravitational force** experienced by that object. This gravitational force is a field force whose magnitude is directly proportional to the mass of the object experiencing the force.

$$F_g = mg$$

The **mass of the object is m**, and g, called the gravitational field, is a vector quantity. Near Earth's surface, **g is 9.8 N/kg** toward Earth's center.

PRACTICE Problems — ADDITIONAL PRAC

16. You place a 4.0-kg watermelon on a spring scale that measures in newtons. What is the scale's reading?

17. You place a 22.50-kg television on a spring scale. If the scale reads 235.2 N, what is the gravitational field?

8	Describe the factors that drag force depends on.	Student Textbook Get it	96

A drag force is the force exerted by a fluid on an object opposing motion through the fluid.

This force is dependent on the:

- Motion of the object- more the speed of the object, more is the drag force.
- The properties of the object- more size and area of object, more is the drag force.
- The properties of the fluid that the object is moving through-density and viscosity of the fluid- more density, more drag force

Get It?

Describe how the wingsuits shown in the photo at the beginning of the module affect the drag force experienced by the skydivers.

9	[1] Define terminal velocity. [2] Apply Newton's second law to calculate the drag force when terminal velocity is reached.	Student Textbook Check Your Progress 22	97

Terminal velocity

The constant velocity that is reached when the drag force equals the force of gravity is called the terminal velocity.

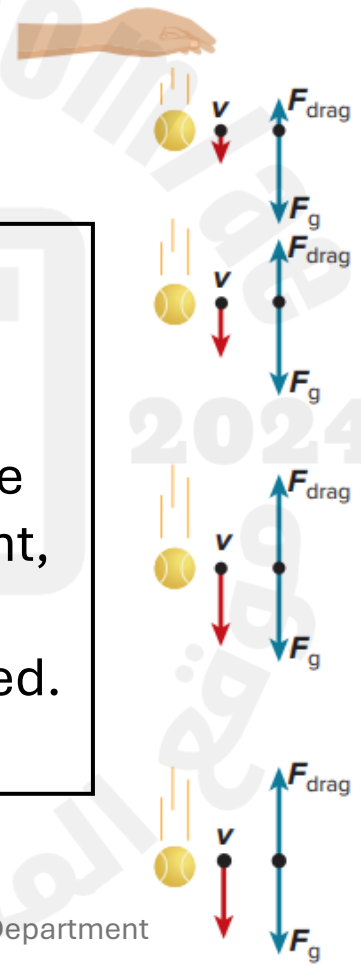
At Terminal velocity, Drag force= Weight

22. **Terminal Velocity** The skydiver in **Figure 13** falls at a constant speed in the spread-eagle position. Immediately after opening the parachute, is the skydiver accelerating? If so, in which direction? Explain your answer.

Figure 13

Yes, immediately after opening, Skydiver is accelerating downward. After some time, drag force becomes equal to his weight, and he falls remaining distance with constant speed.
Drag Force = Weight=mg

Figure 12 The drag force on an object increases as its velocity increases. When the drag force equals the gravitational force, the object is in equilibrium.

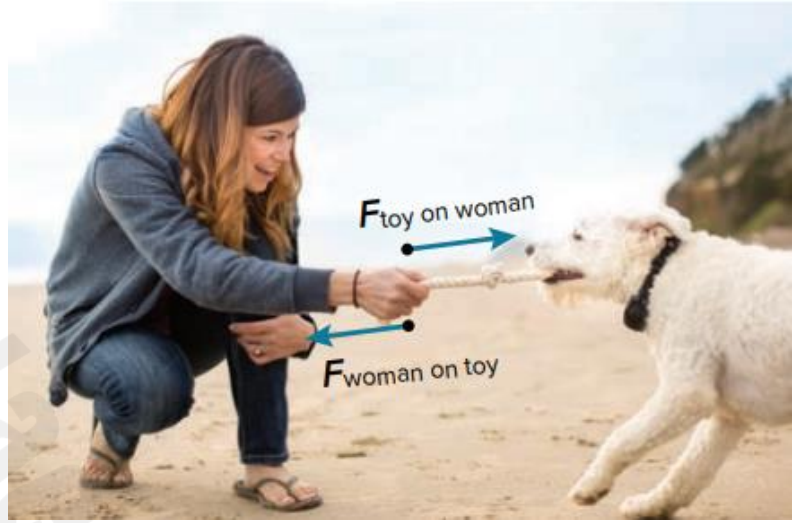


$$F_{drag} = F_g.$$

10	[1] State and explain Newton's third law of motion. [2] Apply the mathematical representation of Newton's Third Law in numerical problems.	Student Textbook	98-99
		Example Problem (4)	100

Definition of Newton's third law

All forces come in pairs. The two forces in a pair act on different objects and are equal in strength and opposite in direction.



Newton's Third Law

The force of A on B is equal in magnitude and opposite in direction of the force of B on A.

$$F_{A\ on\ B} = -F_{B\ on\ A}$$

EXAMPLE Problem 4

EARTH'S ACCELERATION A softball has a mass of 0.18 kg. What is the gravitational force on Earth due to the ball, and what is Earth's resulting acceleration? Earth's mass is 6.0×10^{24} kg.

1 ANALYZE AND SKETCH THE PROBLEM

- Draw free-body diagrams for the two systems: the ball and Earth.
- Connect the interaction pair by a dashed line.

KNOWN

$m_{ball} = 0.18$ kg

$m_{Earth} = 6.0\times10^{24}$ kg $\quad g = 9.8$ N/kg

UNKNOWN

$F_{Earth\ on\ ball} = ?$

$a_{Earth} = ?$

2 SOLVE FOR THE UNKNOWN

Use Newton's second law to find the weight of the ball.

$F_{Earth\ on\ ball} = m_{ball}g = (0.18\ kg)(-9.0\ N/kg) = -1.8$ N

Substitute $m_{ball} = 0.18$ kg, $g = -9.8$ N/kg.

Use Newton's third law to find $F_{ball\ on\ Earth}$.

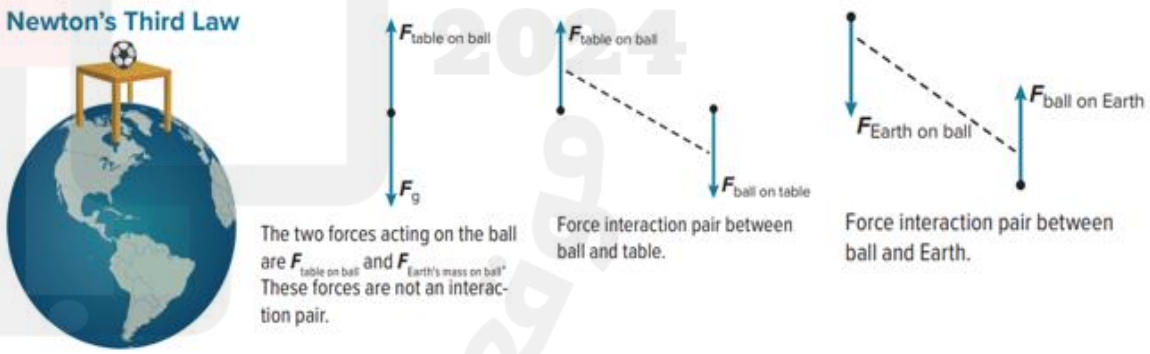
$F_{Ball\ on\ Earth} = -F_{Earth\ on\ ball} = -(-1.8\ N) = +1.8$ N

Substitute $F_{Earth\ on\ ball} = -1.8$ N.

Use Newton's second law to find a Earth.

$$a_{Earth} = \frac{F_{net}}{m_{Earth}} = \frac{1.8\ N}{6.0\times10^{24}\ kg} = 2.9\times10^{-25}\ m/s^2 \text{ toward the softball}$$

Substitute $F_{net} = 1.8$ N, $m_{Earth} = 6.0\times10^{24}$ kg.



11	Define the tension force and explain how Newton's Third Law applies to forces on strings and ropes.	Student Textbook	101

Tension

Tension is simply a specific name for the force that a string or rope exerts.

Tension in the rope = the weight of all objects below it

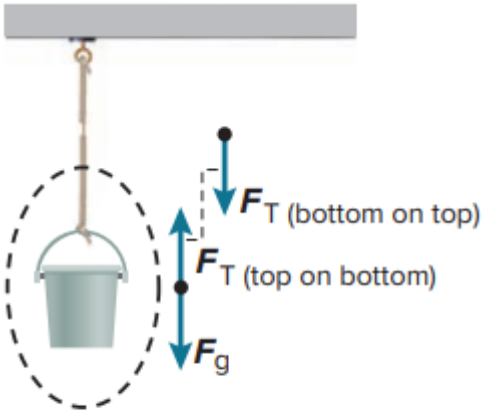


Figure 17 The tension in the rope is equal to the weight of all the objects hanging from it.

12	Define the normal force and use examples to show that the normal force is not always equal in magnitude to the weight of the object.	Student Textbook	103

The Normal Force the perpendicular contact force that a surface exerts on another surface.

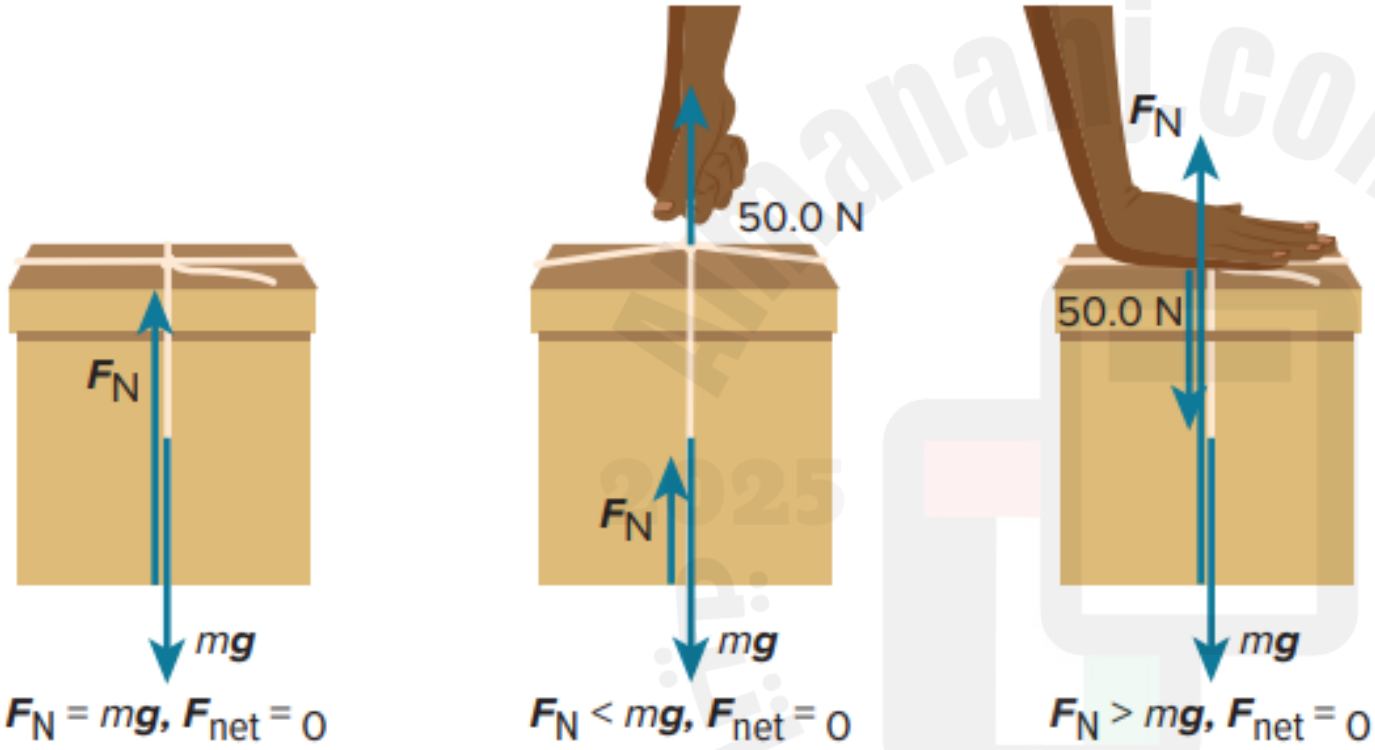


Figure 19 The normal force is not always equal to the object's weight.

- The **normal force always is perpendicular to the plane** of contact between two objects
- The normal force is **NOT always equal to the weight** of the object.

13	Distinguish between static and kinetic friction.	Student Textbook	118

Kinetic and Static Friction

Kinetic friction is exerted on one surface by another when the two surfaces rub against each other because one or both surfaces are moving.

Static friction, which is the force exerted on one surface by another when there is no motion between the two surfaces.

14	Relate graphically the frictional force to the normal force and find the coefficient of kinetic Friction	Student Textbook	118-119

$$F_{f,\,kinetic} = \mu_k F_N$$

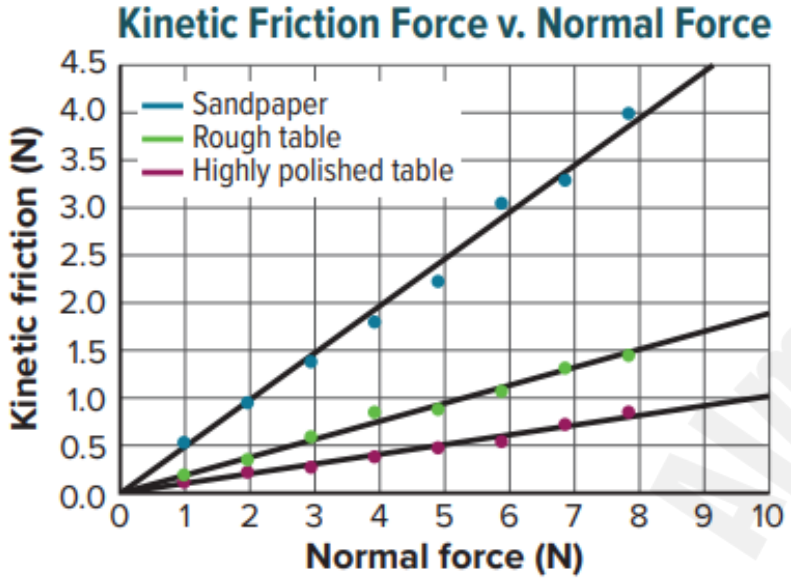


Figure 12 A plot of kinetic friction v. normal force for a block pulled along different surfaces shows a linear relationship between the two forces for each surface. The slope of the line is μ_k.

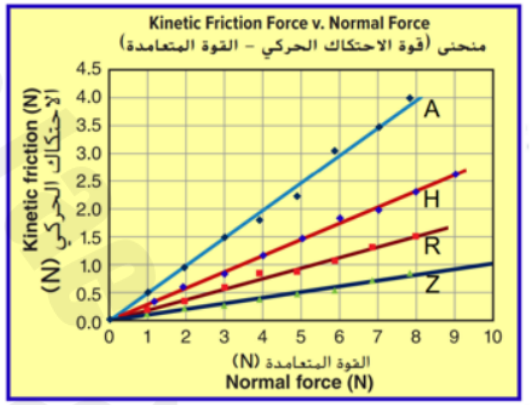
Compare *the coefficient of kinetic friction for the three surfaces shown on the graph.*

Calculate the coefficient of kinetic friction for:

1. **Sandpaper**
2. **Rough table**
3. **Highly polished surface**

The figure below of the kinetic friction vs normal force for a block pulled along different surfaces (A,H,R,Z) shows a linear relationship between the two forces for each surface. Which of the following statements is correct?

يوضح الشكل أدناه الاحتكاك الحركي مقابل القوة العمودية لكتلة مسحوبة على أسطح مختلفة (A,H,R,Z) ويوضح العلاقة الخطية بين القوتين لكل سطح. أي من العبارات التالية صحيحة؟



1. $(\mu_k)_A > (\mu_k)_H > (\mu_k)_Z$
2. $(\mu_k)_Z > (\mu_k)_R > (\mu_k)_A$
3. $(\mu k)_Z > (\mu_k)_H > (\mu_k)_R$
4. $(\mu_k)_H > (\mu_k)_A > (\mu_k)_Z$

15	Identify the forces acting on an object moving on an inclined plane and draw the free body diagram.	Student Textbook	125

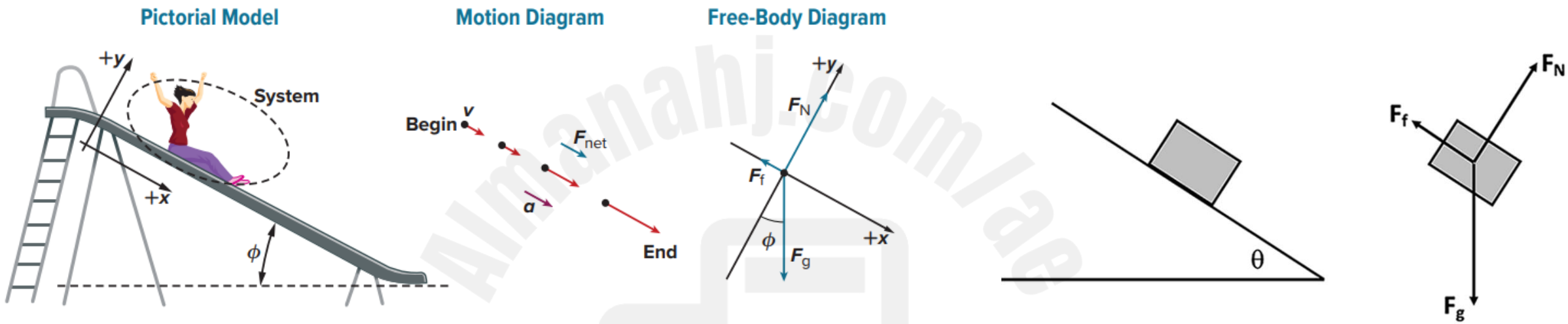


Figure 17 The girl's weight causes her to accelerate down the slide.

Describe *how the component of the girl's weight parallel to the incline changes when the angle between the slide and the horizontal increases.*