

مراجعة للدروس وفق الهيكل الوزاري الجديد منهج انسابير القسم الموضوعي



تم تحميل هذا الملف من موقع المناهج الإماراتية

موقع المناهج ← المناهج الإماراتية ← الصف الثامن ← علوم ← الفصل الأول ← ملفات متنوعة ← الملف

تاريخ إضافة الملف على موقع المناهج: 22:59:10 2025-11-19

ملفات اكتب للمعلم اكتب 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 للمدرس

المزيد من مادة
علوم:

إعداد: Hafez Ahmad

التواصل الاجتماعي بحسب الصف الثامن



صفحة المناهج
الإماراتية على
فيسبوك

الرياضيات

اللغة الانجليزية

اللغة العربية

التربية الاسلامية

المواد على تلغرام

المزيد من الملفات بحسب الصف الثامن والمادة علوم في الفصل الأول

حل نموذج اختبار تجريبي وفق الهيكل الوزاري القسم الموضوعي منهج بريدج

1

نموذج اختبار تجريبي وفق الهيكل الوزاري القسم الموضوعي منهج بريدج

2

حل نموذج اختبار تجريبي وفق الهيكل الوزاري القسم الكتابي منهج بريدج

3

نموذج اختبار تجريبي وفق الهيكل الوزاري القسم الكتابي منهج بريدج

4

نموذج اختبار تجريبي نهائي في القسم الموضوعي

5

8G Science EOT 2025/2026

First Semester

Prepared by:

Mr. Ahmed Hafez
0545963426

هام جدا:
نظام هذه المراجعة كالاتي:

- 1- المراجعة مقسمة حسب ترتيب الدروس في المنهج و ليس حسب ترتيب الهيكل
- 2- تبدأ مراجعة كل درس بملخص الدرس ثم الأسئلة المتوقعة ثم أسئلة تدريبية
- 3- الأسئلة المتوقعة هي الأسئلة ال screenshot

1. Relative Dating

Unit 1 Lesson 1 summary:

-Relative age dating is comparing without knowing the exact age
-Absolute age dating is using exact numbers

- **Superposition:** Old rocks are on the bottom. New rocks are on the top.

Original Horizontality: Rock layers start out flat.

Cross-Cutting: What cuts through a rock is younger than the rock.

Law of Inclusion: A piece of rock found inside another rock is older than the rock that holds it

Fossils: the remains of a plant or animal that lived a very long time ago. 🦕

The younger the fossil (up), the more complex it is. The older the fossil (down) the simpler it is.

When fossils disappear we know that this is the time when the organism became extinct.

-يتم مقارنة التاريخ العمري النسبي دون معرفة العمر الدقيق -
التاريخ العمري المطلق يستخدم الأرقام الدقيقة

الصخور القديمة في الأسفل .صخور جديدة في القمة.

تبدأ طبقات الصخور بشكل مسطح:

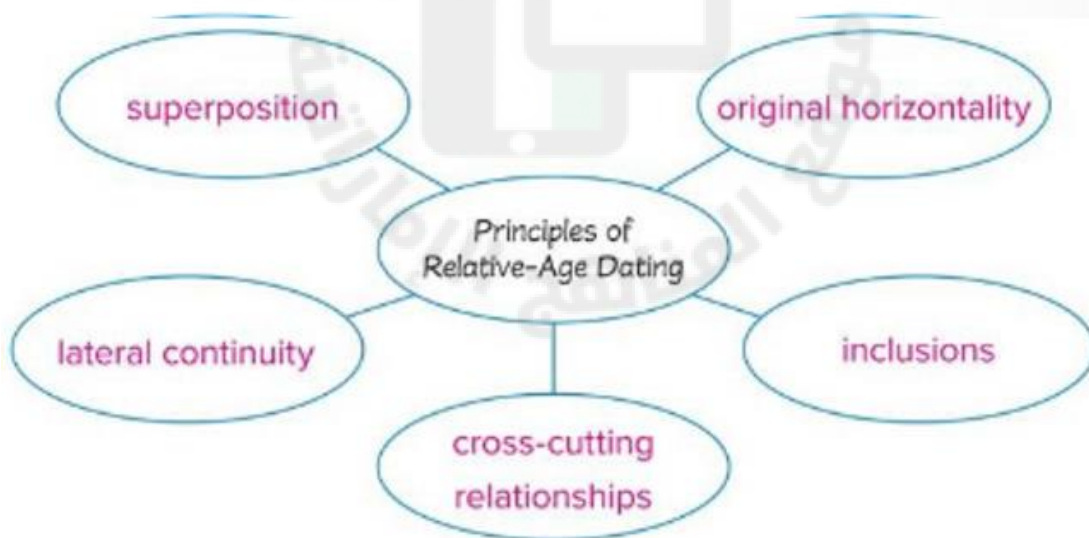
ما يخرق الصخرة أصغر من الصخرة.

قطعة من الصخور الموجودة داخل صخرة أخرى أقدم من الصخرة التي تحملها

🦕. لحفريات: بقايا نبات أو عاش منذ زمن طويل جدا

كلما كانت الحفريات أصغر سنا (لأعلى) ، زادت تعقيدها. كلما كانت الحفريات أقدم (أسفل) كلما كانت أبسط.

عندما تختفي الحفريات ، نعلم أن هذا هو الوقت الذي انقرض فيه الكائن الحي.



Q24

1. How can the position of fossils in rock layers help determine their relative age?
 - Fossils in lower layers are usually older than fossils in higher layers.
2. What geological principles help scientists understand the sequence of rock formation?
 - Principles:
 - superposition
 - original horizontality
 - cross-cutting relationships
 - inclusions
3. How does the presence of faults affect the interpretation of rock layer ages?
 - Faults are newer than rocks they cut
4. What does the principle of original horizontality tell us about sedimentary layers?
 - Original horizontality: sediments are laid down flat; tilted layers were moved later.
5. How can inclusions in rocks help determine which layer is older?
 - Inclusions: fragments inside a rock are older than the rock that contains them.
6. What does the discovery of marine fossils in mountain rocks tell us about Earth's past environments?
 - Marine fossils on mountains mean the rocks were once under the sea
7. What scientific idea explains that natural processes observed today also occurred in the past?
8. Uniformitarianism
9. How does fossil evidence support the idea that Earth's surface changes over time?
 - Fossils are different so this means that earth changes over time

Q1: What type of dating method helps us know if one rock layer is older or younger than another?

- A. Absolute dating
- B. Chemical dating
- C. Relative dating
- D. Modern dating

Q2: In relative dating, scientists use fossil records. What are fossils?

- A. Pieces of new rock
- B. Preserved remains of ancient life
- C. Water found deep underground
- D. Types of minerals

Q3: What is the main principle used in relative dating of rock layers?

- A. The layers with more iron are older
- B. The Principle of Superposition
- C. The layers that are thicker are older
- D. The Law of Conservation of Mass

Q4: A scientist finds a layer of rock with a specific index fossil. This index fossil helps the scientist determine the layer's _____

- A. Exact mass
- B. Relative age
- C. Chemical composition
- D. Current location

Q5: Relative dating determines the sequence of events without finding the exact age. What is a "sequence of events"?

- A. The speed at which rocks form
- B. The order in which things happened
- C. The size of the rocks
- D. The current weather

Read each sentence and decide if this is relative or absolute age dating

1. A scientist found a rock layer with a dinosaur fossil. The layer below it has an older fossil.
2. A geologist used a special machine to find out a rock is 500 million years old.
3. We know the Jebel Hafeet mountain is older than the skyscrapers in Dubai.
4. A scientist found a human bone and discovered it is 50 years old.

2. Superposition Principle

Q1: What is the name of the principle that states that in undisturbed rock layers, the oldest layer is at the bottom?

- A. Law of Uniformity
- B. Principle of Superposition
- C. Law of Original Horizontality
- D. Relative Dating Rule

Q2: According to the Principle of Superposition, which rock layer is the youngest?

- A. The one with the most fossils
- B. The layer on top
- C. The layer at the bottom
- D. The layer in the middle

Q3: This principle is a key tool in geology for determining the relative age of...

- A. Earthquakes
- B. Volcanic eruptions
- C. Sedimentary rock layers
- D. Ocean water

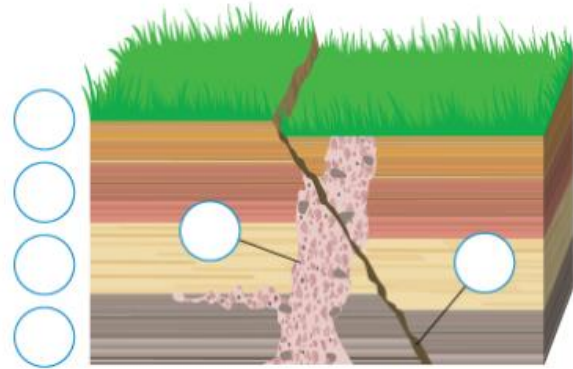
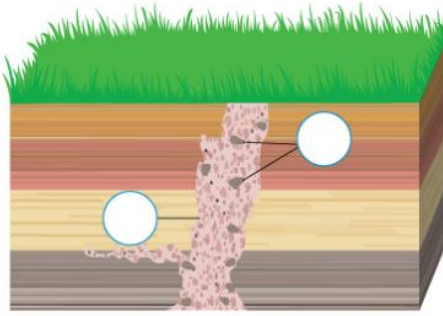
Q4: If a sequence of rock layers has been folded (bent) or broken, is the Principle of Superposition still easy to apply?

- A. Yes, always
- B. No, only if the folds are small
- C. No, because the layers are no longer undisturbed
- D. Yes, because it only depends on the fossils

Q5: The Law of Original Horizontality states that sedimentary rock layers are originally deposited in which way?

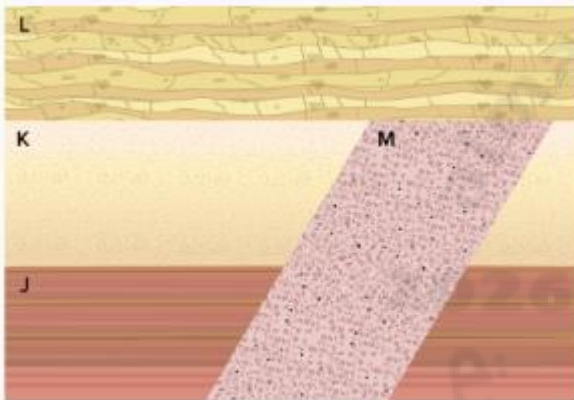
- A. Vertically
- B. Diagonally
- C. Horizontally
- D. In a circle





2. Order the features in the illustration from oldest to youngest.

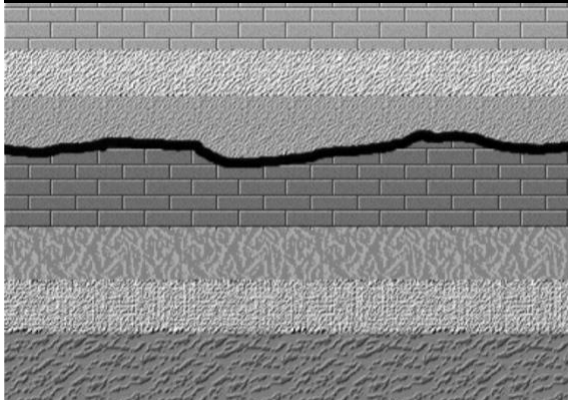
☐	A JKLM
☐	B MJKL
☐	C JKML
☐	D MLKJ



Which geologic principle must be assumed to determine the relative age of M?

- A cross-cutting relationships
- B superposition
- C original horizontality
- D inclusions

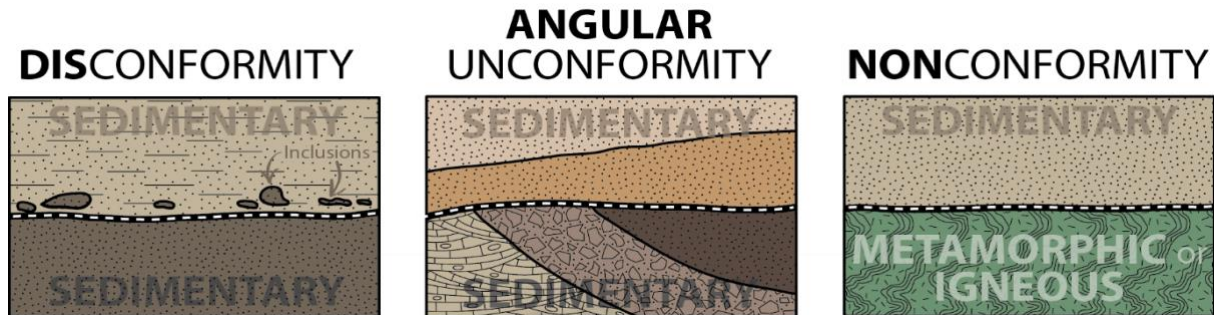
: Give the **relative age** for this sequence of rocks. What **principle** did you use?



Unit 1 Lesson 2 summary:

Unconformity: missing rock because of erosion.

Unconformity صخور مفقودة بسبب التعرية.



Two sedimentary rock over each other
Disconformity: two sedimentary
فوق بعضهما البعض

One layer is tilted
Angular unconformity: طبقة واحدة مائلة

sedimentary rock over another type
Nonconformity]: على نوع آخر sedimentary

Correlation: Matching rock layers or fossils from different locations to fill gaps in rock record

Index fossils: Fossils of organisms that lived a short time

If two rock layers have the same index fossils, they're likely the same age.

Scientists used relative age dating, correlation and index fossils to make a geologic time scale describing all of earth history

The geologic time scale divides earth history into units:
Eons → eras → periods → epochs.

Correlation

مطابقة طبقات الصخور أو الحفريات من مواقع مختلفة لملء الفجوات في السجل الصخري

Index fossils

أحافير الكائنات الحية التي عاشت لفترة قصيرة

إذا كانت طبقتان صخريتان لهما نفس index fossil ، فمن المحتمل أن يكونا من نفس العمر

استخدم العلماء relative age dating و correlation و index fossils أو key beds لعمل مقياس زمني جيولوجي يصف كل تاريخ الأرض

يقسم المقياس الزمني الجيولوجي تاريخ الأرض إلى وحدات :
eons → eras → periods → epochs

INVESTIGATION

Gaps in the Rock Record

1. Analyze the three photos below. Notice how the arrows point to a line between different rocks. How would you describe the rock below the arrows versus the rock above? Write your descriptions next to each image.



horizontal sedimentary layer
overlies horizontal sedimentary
layer

disconformity



horizontal sedimentary layer
overlies tilted sedimentary layer

Angular unconformity



horizontal sedimentary layer
overlies nonsedimentary layer

Nonconformity

3. Geological Record

Q1: What is the geological record mainly used for?

- A. To predict the weather
- B. To study ocean currents
- C. To show the sequence of Earth's history
- D. To measure the height of mountains

Q2: The geological record is mainly preserved in what kind of material?

- A. Water
- B. Air
- C. Rock layers
- D. Soil

Q3: The geological record includes evidence of what type of changes over time?

- A. Chemical changes only
- B. Physical and biological changes
- C. Weather patterns only
- D. Lunar cycles

Q4: Scientists analyze and interpret rock (layers) to understand...

- A. The current climate
- B. The amount of water underground
- C. Earth's history
- D. The Earth's magnetic field

Q5: Which of these is a key component of the geological record, representing past life?

- A. Atmosphere
- B. Satellite data
- C. Fossil record
- D. Ocean tides

4. Geological Time Scale

Q1: How do scientists use the Geological Time Scale?

- A. To measure daily changes in the Earth
- B. To organize Earth's 4.6 billion year history
- C. To predict when a volcano will erupt
- D. To track the movement of continents

Q2: Which evidence is used to interpret Earth's history on the Geological Time Scale?

- A. Satellite images
- B. Air temperature records
- C. Rock strata and fossils
- D. Ocean tide movements

Q3: The largest time unit on the Geological Time Scale is called a/an..

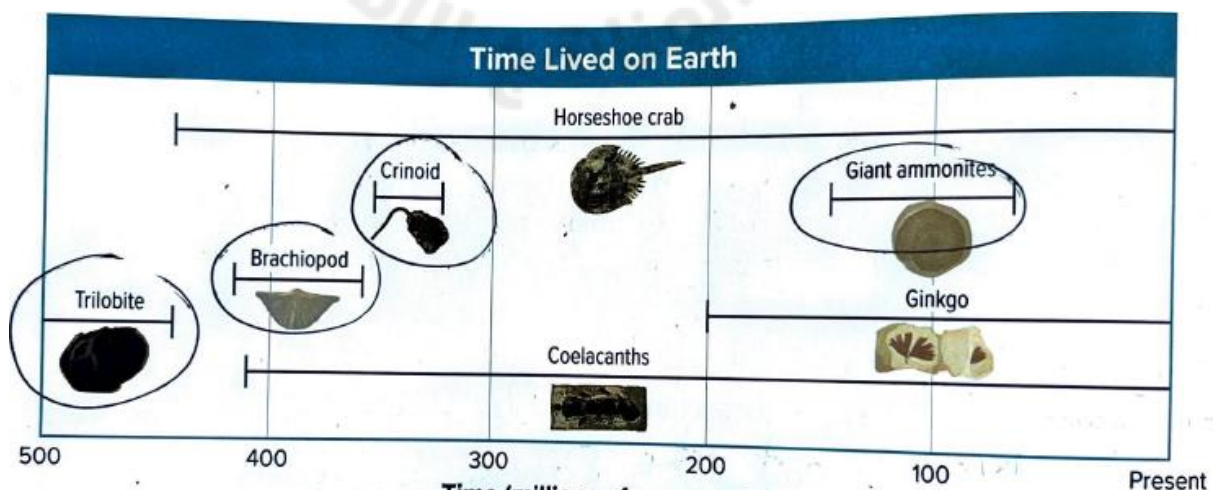
- A. Period
- B. Epoch
- C. Era
- D. Eon

Q4: The divisions (eras, periods, epochs) in the Geological Time Scale are mainly based on...

- A. Changes in temperature
- B. Significant changes in life forms
- C. The movement of the Sun
- D. The thickness of rock layers

Q5: What is the main purpose of constructing scientific explanations based on the Geological Time Scale?

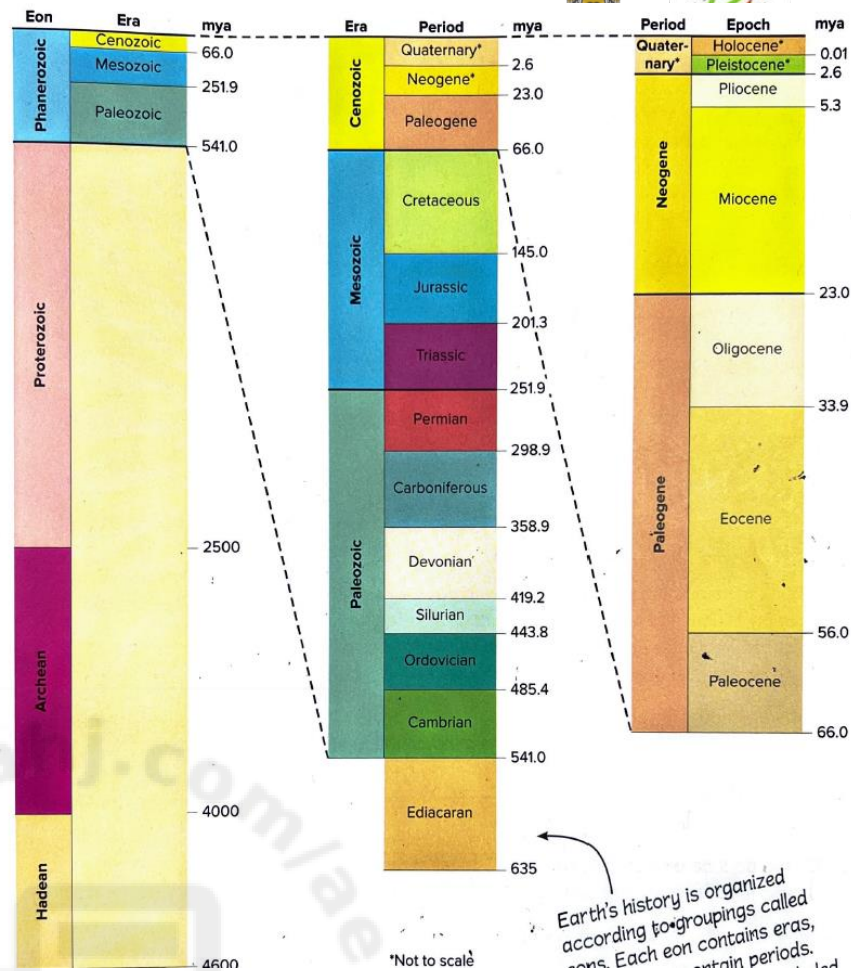
- A. To find valuable minerals
- B. To justify the use of certain materials
- C. To enhance understanding of Earth's history
- D. To predict the end of the Earth



which of these fossils can be considered an index fossil?

- 1- Complete:
The geologic time scale is made of units called _____ , _____ , _____ and _____
- 2- How many eons are there?
- 3- Which eon is the longest?
- 4- How many periods are in the Mesozoic era?
- 5- How many epochs are in the Paleogene period?
- 6- Complete:
Eons are made of _____ that are made of _____ that are made of _____

Arrange the following from biggest to smallest: (periods , epochs, era, eon



Unit 2 Lesson 1 summary:

To describe position you need three things:

- 1- A **reference point** is a place, position, or object used to describe the position of an object
- 2- **distance**
- 3- **direction** (east, west, north, south, left, right, forward, backward)

Motion is the change in the position of an object with respect to a **FIXED** reference point.

North, east, right, up , forward → positive
South, west, left, down, backward → negative

لوصف الموضع ، تحتاج إلى ثلاثة أشياء
1- النقطة المرجعية هي مكان أو موضع أو كائن يستخدم لوصف موضع كائن

2- المسافة

3- الاتجاه (الشرق ، الغرب ، الشمال ، الجنوب ، اليسار ، اليمين ، الأمام ، الخلف)

الحركة هي التغيير في موضع الجسم فيما يتعلق بالنقطة المرجعية .

Distance is the length of the path an object travels between two points.

Distance is measured in **meter and its derivatives**

Example: The **distance** between Abu Dhabi and Douha is **588.7 kilometer**



Displacement is the **distance and direction** between where the object started and where it ended up.

Displacement is measured in **meter and direction**

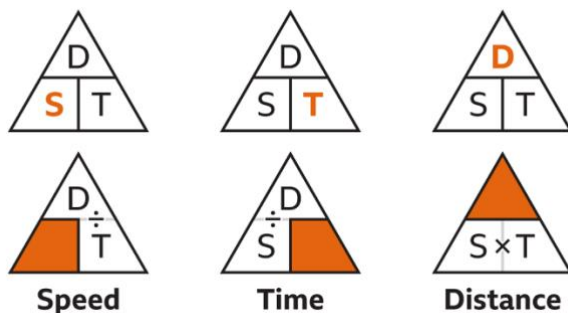
Example: The **displacement** between Abu Dhabi and Douha is **350 kilometer west**

Speed is the **distance** an object travels in an amount of **time**.

Speed equation:

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

- symbol: d
- SI unit of measurement: meter (m)
- symbol: s
- SI unit of measurement: meters per second (m/s)
- symbol: t
- SI unit of measurement: second (s)



In a distance-time graph:

Time is on the X axis

المسافة هي طول المسار الذي يقطعه الجسم بين نقطتين.

تقاس المسافة بالمتري ومشتقاته
مثال: تبلغ المسافة بين أبوظبي والدوحة 589 كيلومترا

الإزاحة هي المسافة والاتجاه بين المكان الذي بدأ فيه الجسم وأين انتهى به .

يتم قياس الإزاحة بالمتري والاتجاه مثال :
الإزاحة بين أبوظبي والدوحة 350 كيلومترا غربا

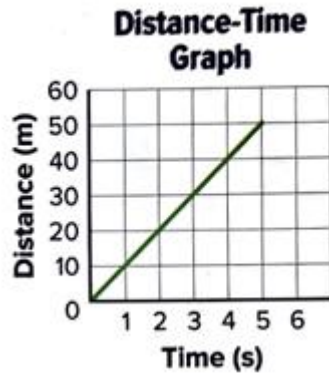
Distance is on the Y axis

في الرسم البياني لمسافة مع الزمن:

Types of distance- time graphs

Constant speed in positive direction

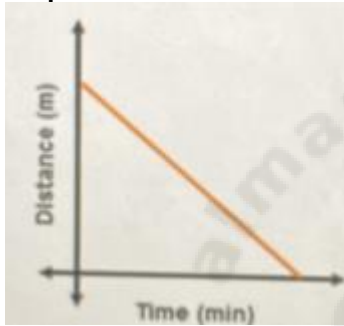
Upward- right slope



سرعة ثابتة في الاتجاه الإيجابي
تصاعد - يمين

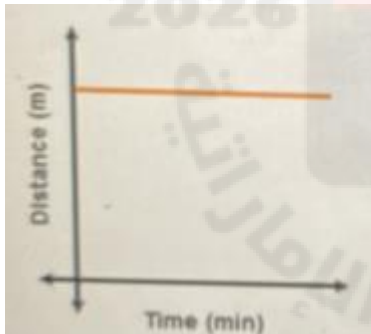
Constant speed in negative direction

Downward-right slope

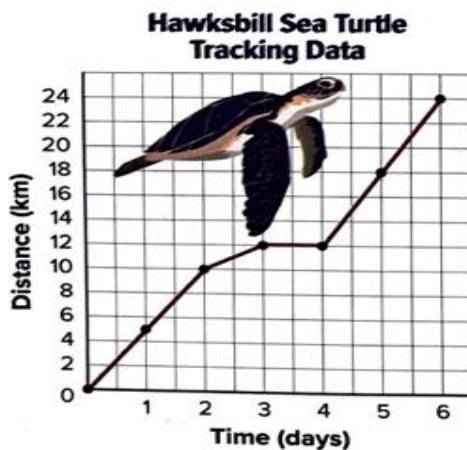


سرعة ثابتة في الاتجاه السلبي
لأسفل إلى اليمين

Stopping
no slope



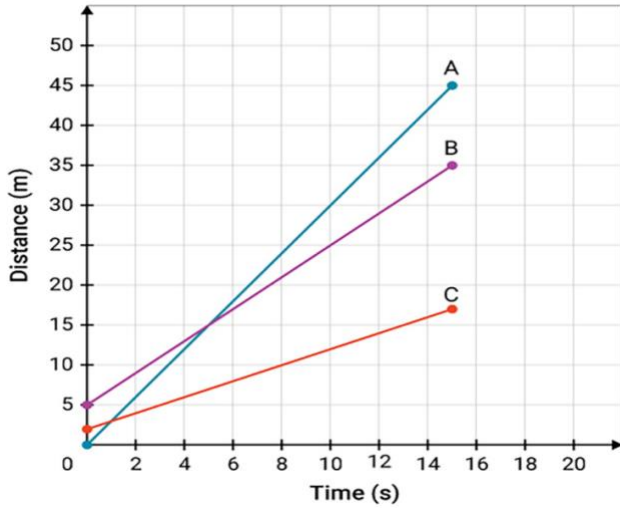
Changing speed
changing slope



إيقاف
الخط المسطح

تغيير السرعة
أجزاء مختلفة

The line with the highest slope is the fastest. In this example, object A is the fastest because it has the highest slope



Speed is the **distance** an object travels in an amount of **time**.

Velocity is the **distance** an object travels in an amount of **time IN A CERTAIN DIRECTION**

Example:

150 Km/hr → speed

150 km/hr WEST → Velocity

2 m/s → speed

2 m/s EAST → velocity

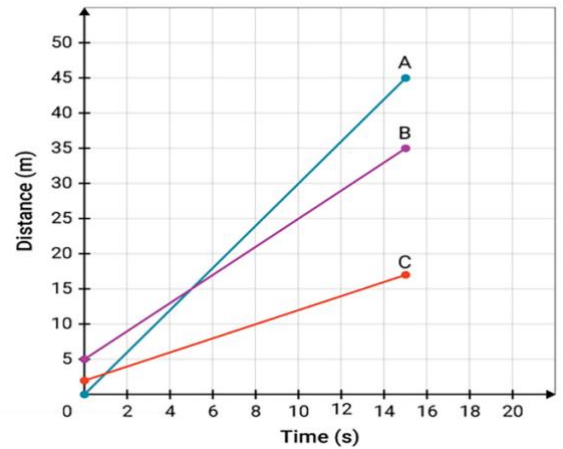


Same **SPEED (NUMBER)** but different **VELOCITY (DIRECTION)**

The velocity changes when:

- speed changes
- direction changes

الخط الذي يحتوي على أعلى منحدر هو الأسرع: في هذا المثال، يكون الكائن A هو الأسرع لأنه يحتوي على أعلى منحدر



السرعة هي المسافة التي يقطعها الجسم في فترة زمنية.

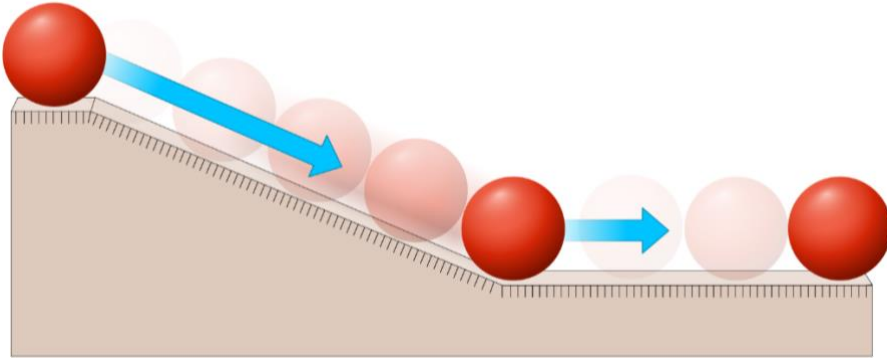
الvelocity هي المسافة التي يقطعها الجسم في فترة زمنية في اتجاه معين



نفس السرعة (نفس الرقم) ولكن velocity مختلفة (اتجاه مختلف)

تتغير velocity عندما :

تتغير قيمة السرعة
بتغير اتجاه الحركة



We use arrows to describe velocity
The longer the arrow, the higher the velocity
The direction of the arrow is the direction of velocity.

نستخدم الأسهم لوصف vector
كلما طالت السهم ، زادت السرعة
اتجاه السهم هو اتجاه السرعة.

Question 1 a

3) To determine if an object has changed position, you need to know its position relative to another object. _____

- ☐ True
☐ False

Question 2 b

1) In order to determine an object's location, you need a _____.

- ☐ A) time
☒ B) reference point
☐ C) speed
☐ D) displacement

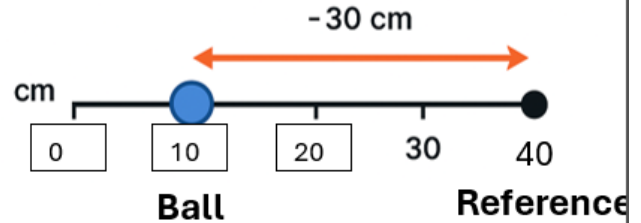
Question 10 a

If a ball is placed at the 10 cm mark and your reference point is at the 40 cm mark, how would you describe the ball's position relative to the reference point?

The ball is **30 cm to the left** of the reference point.

Here's why:

- Reference point: **40 cm**
- distance: **30 cm**
- Direction: left (-)



Question 10 b

INVESTIGATION

Start from Here

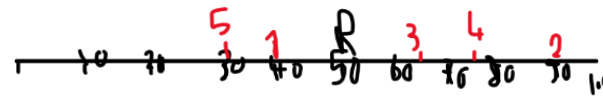
1. Put a sticky note at the 50-cm mark of a meterstick. This is your reference point.
2. Place a small object at the 40-cm mark. It is 10 cm in the negative direction from the reference point.

EXPLORE/EXPLAIN LESSON

3. Continue moving the object and recording its distance, its reference direction, and its position to complete the table below.

Position of Object		
Distance (cm)	Reference Direction	Position (cm)
10 cm	negative	40 cm
40 cm	positive	$50 + 40 = 90$
15 cm	positive	$50 + 15 = 65$
25	positive	$50 + 25 = 75$
20	-	$50 - 20 = 30$

Ref = 50 cm



4. How would the data in the table change if the positions were the same, but the reference point was at the 40-cm mark? Complete the table below with the new information.

Position of Object		
Distance (cm)	Reference Direction	Position (cm)
0	-	40
50	+	90
25	+	65
35	+	75
10	-	30

Ref = 40

same Position



4. What happens to an object's displacement if it returns to its starting point?

- If an object returns to its start, displacement = 0.

8. What is the average speed of a soccer ball that travels 34 m in 2.0 s? Need: S

How:

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

Calculate:

$$\text{speed} = \frac{34 \text{ m}}{2.0 \text{ s}} = 17 \text{ m/s}$$

Question 3 a

A cyclist travels 60 kilometers in 2 hours. How would you calculate their average speed, and what does it tell you about their motion?

Need: S

How: $\text{speed} = \frac{\text{distance } (d)}{\text{time } (t)}$

Calculate $\text{speed} = \frac{60 \text{ km}}{2 \text{ h}} = 30 \text{ km/h}$

This tells us that, on average, the cyclist covers 30 kilometers every hour.

Question 3 b

1. A truck driver makes a trip that covers 2,380 km in 28 hours. What is the driver's average speed in km/h?

Need: S

How: $\text{speed} = \frac{\text{distance } (d)}{\text{time } (t)}$

Calculate $\text{speed} = \frac{2380 \text{ km}}{28 \text{ h}} = 85 \text{ km/h}$

Question 16 b

3. How long would it take a bus traveling at 52 km/h to travel 130 km?

Need: Time

How:

$$\text{time} = \frac{\text{distance}}{\text{speed}}$$

Calculate:

$$\text{time} = \frac{130 \text{ km}}{52 \text{ km/h}} = 2.5 \text{ h}$$

Question 16 a

10) A driver needs to make a delivery to an office that is 30 km away. The driver has traveled for 45 minutes west down a straight road at 50 km/h.

a. Has the driver traveled far enough to reach the office? Support your response.

$$\text{Distance} = \text{speed} \times \text{time}$$

Convert the time to hours:

$$\text{time in hours} = \text{time in minutes} \div 60$$

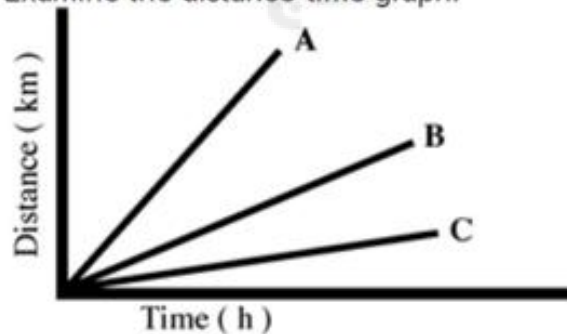
$$\text{time in hours} = 45 \text{ minutes} \div 60 = 0.75 \text{ h}$$

$$\text{Distance} = 50 \times 0.75 = 37.5 \text{ km}$$

Yes, because driver has traveled **37.5 km**, which is greater than the **30 km** distance to the office.

Question 7 b

9) Examine the distance-time graph.



a. Which line represents travel at the fastest speed? Justify your answer.

fastest speed is **Line A** → highest slope

5. Position and Motion

Q1: What does the term "position" mean in science?

Prepared by: Mr. Ahmed Hafez

0545963426

- A. The total distance an object moves
- B. The location of an object
- C. The force that pushes an object
- D. How fast an object is moving

Q2: Which word describes a change in an object's position over time?

- A. Mass
- B. Force
- C. Motion
- D. Weight



Q3: To describe an object's position, you need a reference point. What is a reference point?

- A. The final location of the object
- B. A moving object that is nearby
- C. A location you choose to compare the object to
- D. The speed of the object

Q4: A straight-line path between the start and end point of an object's motion is called...

- A. Distance
- B. Acceleration
- C. Displacement
- D. Speed

Q5: When an object moves, its position relative to the reference point...

- A. Stays the same
- B. Increases its mass
- C. Changes
- D. Becomes zero

Q6:

Question 1 a

3) To determine if an object has changed position, you need to know its position relative to another object. _____

- ☐ True
- ☐ False

Q7:

Question 2 b

1) In order to determine an object's location, you need a _____.

- ☐ A) time
- ☐ B) reference point
- ☐ C) speed
- ☐ D) displacement

Read each sentence and then determine the reference point, distance and direction.

1- lulu is 40m to the right of the hospital

Reference point	
Distance	
direction	

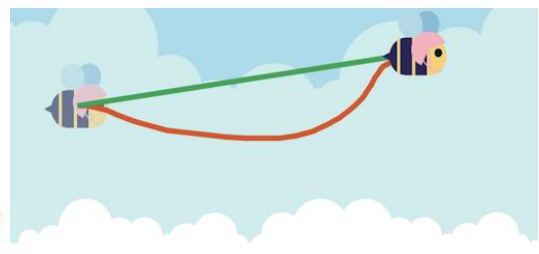
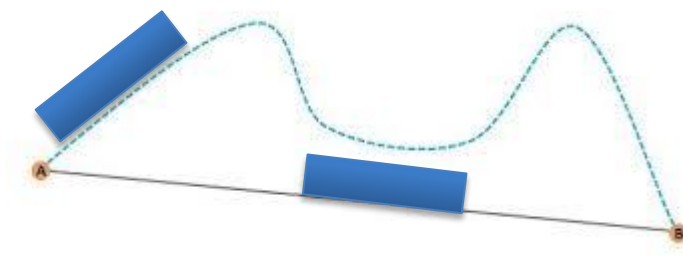
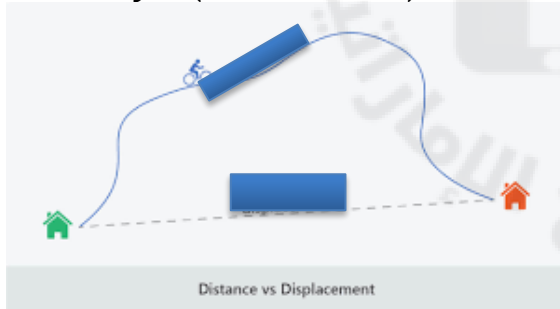
2- The club is 80m west of hamdan's house

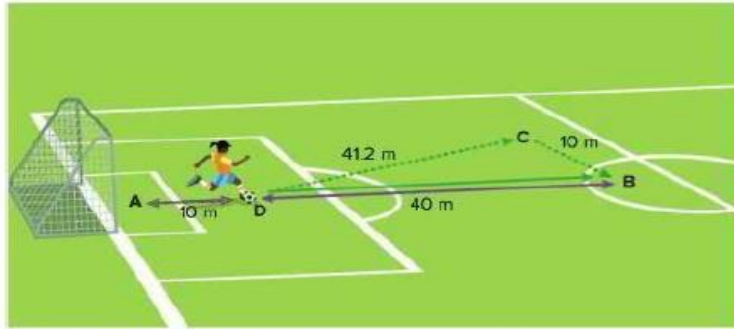
Reference point	
Distance	
direction	

3- Mostafa's house is 40m west of the mall

Reference point	
Distance	
direction	

Activity 1(with class) distance or displacement?





- What is the total distance covered by the player from points A to D to C to B?
- What is the magnitude of the displacement of the player from A to B?

Select all the units of measurement that could be used to describe the speed of an object.

3 correct answers

☐ \$/kg

☐ mm/month

☐ kg/h

☐ s/km

☐ m/s

☐ m/s²

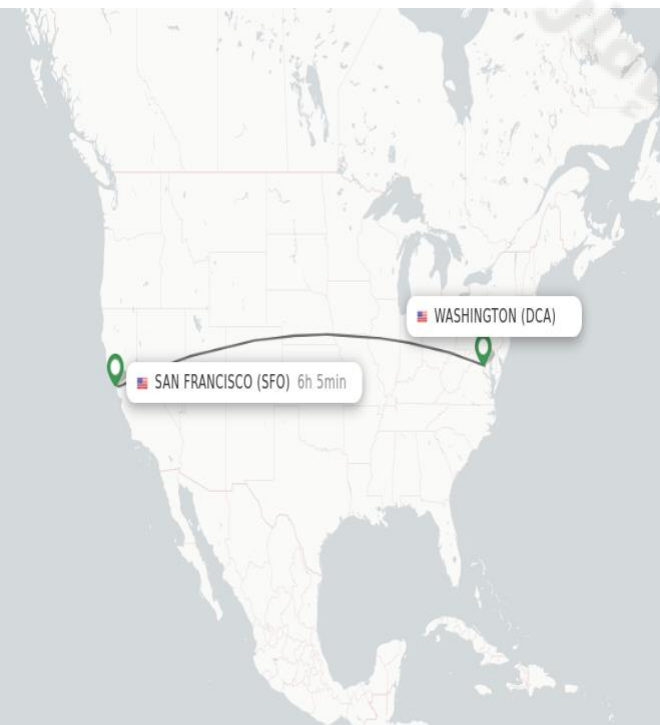
☐ km/h

☐ s²/m

- An airplane flew from San Francisco to Washington, D.C. Approximately halfway through the flight, the plane had traveled 2,000 km in 2.5 hours. What was the speed during this period?

$$s = \frac{D}{t} = \frac{2000}{2.5} =$$

- Another airplane is flying in the opposite direction. It covers the same distance in exactly 2 hours. What was its speed and direction during this period?



- Draw arrows representing the speed and direction of the two planes. Label each arrow with the speed and direction of flight. Use a left-facing arrow for west and a right-facing arrow for east.

First plane

Second plane

6. Motion Graphs

Q1: What does a flat (horizontal) line on a distance-time graph show?

- A. The object is accelerating
- B. The object is stopped
- C. The object is moving quickly
- D. The object is moving backward

Q2: On a distance-time graph, what does a straight line going up (increasing) show?

- A. Constant speed
- B. Decreasing speed
- C. Zero acceleration
- D. Constant acceleration

Q3: What does the slope of a distance-time graph represent?

(Slope)

- A. Acceleration
- B. Time
- C. Speed
- D. Distance

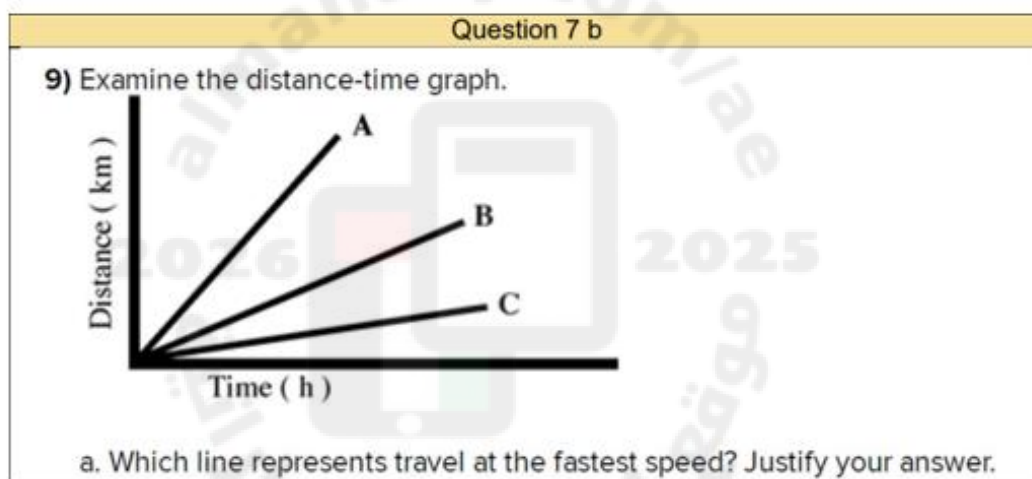
Q4: On a displacement-time graph, a line sloping downwards shows that the object is...

- A. Speeding up
- B. going back
- C. Moving at a constant speed
- D. Slowing down

Q5: A steep line on a distance-time graph means the object is moving...

- A. Slowly
- B. At a constant velocity
- C. Quickly
- D. Backward

Q6:



fastest speed is **Line A** → highest slope

7. Speed vs. Velocity

Q1: Which term describes how fast an object moves without including the direction?

- A. Velocity
- B. Acceleration
- C. Speed
- D. Displacement

Q2: A runner is jogging at 8 km/h East. This statement describes the runner's...

- A. Speed
- B. Velocity
- C. Force
- D. Distance

Q3: To calculate speed, you divide..... by time.

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0545963426

- A. Displacement
- B. Distance
- C. Acceleration
- D. Mass

Q4: If an object's speed is 50 m/s and its velocity is 50 m/s west , which value is providing more information?

- A. Speed
- B. Both provide the same information
- C. Neither is useful
- D. Velocity

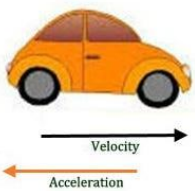
Unit 2 Lesson 2 summary:

Change of velocity is called ACCELERATION

Change in speed or direction is ACCELERATION.

Unit: m/s²

The car is slowing down



The car is speeding up

<https://spl-binal.blogspot.com>

Speeding up → positive direction (arrow in the same direction of motion)

Slowing down → **negative acceleration** (arrow opposite to direction of motion)

An acceleration is caused by a force

Unit: Newton (N)

Force: Push or pull on an object.



التغير في Velocity هو acceleration

التغير في السرعة أو الاتجاه هو acceleration

وحدة القياس: m/s²

التسريع - < التسارع الإيجابي
في التسريع ، تكون السرعة والتسارع في نفس الاتجاه.

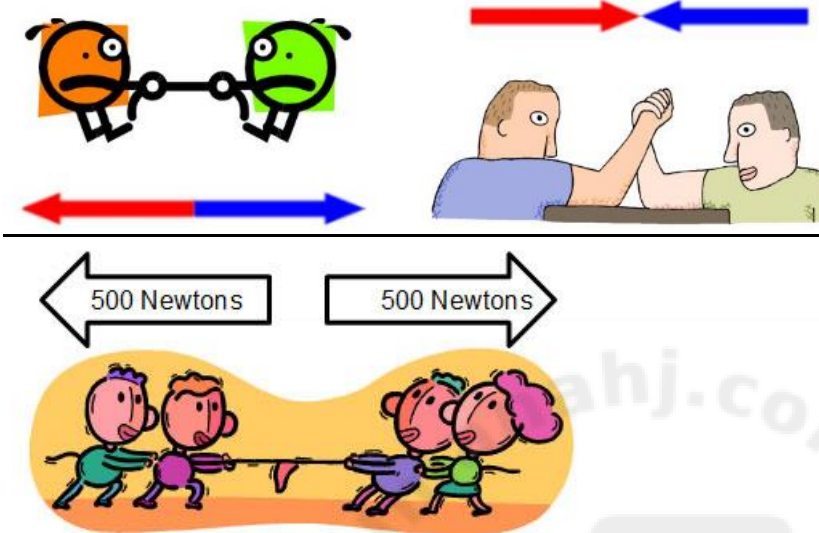
التباطؤ - < التسارع السلبي
في التباطؤ ، السرعة والتسارع في اتجاهين مختلفين

يحدث التسارع بسبب قوة القوة : ادفع أو اسحب جسمًا.
الوحدة (N) Newton :

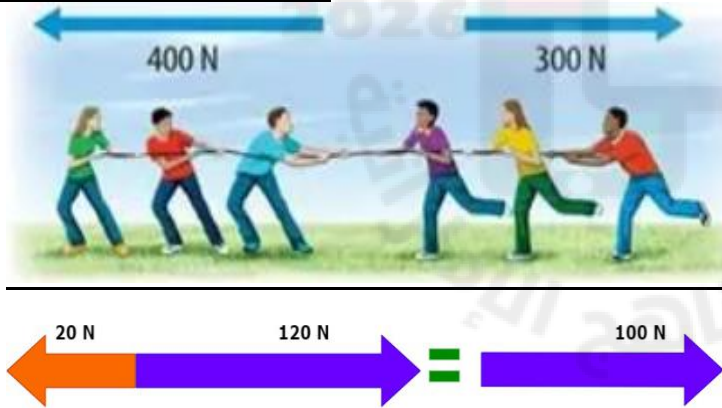
Not all forces will cause an acceleration

Forces can be:

- 1- Balanced (equal in size, Opposite in direction) → net force = zero → no acceleration

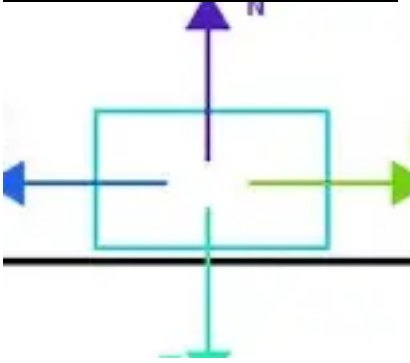


- 2- UnBalanced (unequal on both sides) → net force (right - left) → acceleration



Calculate net force:

(All forces on the right - All forces on the left) , (All forces up - All forces down)



لن تسبب كل القوى تسارعا

يمكن أن تكون القوات :

متوازن (متساو في الحجم ، معاكس في الاتجاه)
(القوة الصافية = صفر
بدون تسارع

غير متوازن

(غير متساو على كلا الجانبين)
(القوة الصافية) اليمين - اليسار
(التسارع

احسب القوة الصافية) :

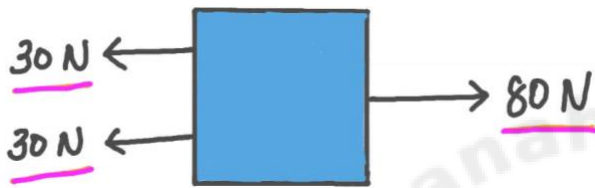
جميع القوى على اليمين - جميع القوى على اليسار)

(جميع القوى لأعلى - كل القوى لأسفل)

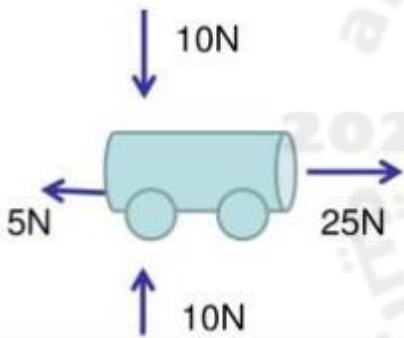
Example:



Net force = -100 N



Net force = $80 - (30 + 30) = 80 - 60 = +20 \text{ N}$



Net force horizontal = $25 - 5 = +20 \text{ N}$

Net force Vertical = zero

Friction (الاحتكاك) is a force that **OPPOSES MOTION** between two surfaces that are touching. When you try to slide an object, friction pulls or pushes in the **OPPOSITE DIRECTION**.

Rough surface = high friction = low motion

Smooth surface = low friction = more motion

Newton first law: (when net force is zero)

"If an object is at rest it will stay at rest. If an object is moving it stays moving with the same velocity"

****قوة**** تعاكس الحركة** بين سطحين متلامسين.
عندما تحاول تحريك جسم، يسحب friction أو يدفع في الاتجاه المعاكس.

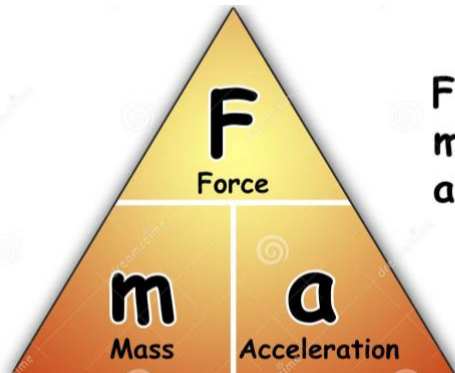
السطح الخشن = الاحتكاك العالي = الحركة المنخفضة
السطح أملس = احتكاك منخفض = مزيد من الحركة

قانون نيوتن الأول): عندما تكون القوة الصافية صفراً)

"إذا كان الجسم في حالة سكون والقوة الصافية صفراً، فسيبقى في حالة راحة".
"إذا كان الجسم يتحرك والقوة الصافية كانت صفراً فإنه يظل يتحرك بنفس السرعة"

Newton second law: (when net force is not equal to zero)

An object will accelerate only when net force is not equal to zero (unbalanced force)



$$F = m \times a$$

$$m = F / a$$

$$a = F / m$$

More mass → less acceleration
(heavy objects accelerate less)

Less mass → more acceleration
(light objects accelerate more)

Mass and acceleration are INVERSELY PROPORTIONAL

More force → more acceleration
Less force → less acceleration

Force and acceleration are DIRECTLY PROPORTIONAL

قانون نيوتن الثاني): عندما لا تكون القوة الكلية تساوي صفرا
لن يتسارع الجسم إلا عندما لا تساوي القوة الكلية صفرا

كتلة أكبر (تسارع أقل)
لأجسام الثقيلة تتسارع أقل

كتلة أقل (تسارع أكبر)
الأجسام الخفيفة تتسارع أكثر

الكتلة والتسارع متناسبان عكسيا

قوة أكبر (تسارع أكبر)
قوة أقل (تسارع أقل)

القوة والتسارع متناسبان طرديا

Question 4 a

A motorcycle has a mass of 500 kg, and a force of 1500 N is applied to it. What is its acceleration?

Need: acceleration (a)

How:

$$\text{acceleration (a)} = \frac{\text{force}}{\text{mass}}$$

Calculate

$$\text{acceleration (a)} = \frac{1500 \text{ N}}{500 \text{ kg}} = 3.0 \text{ m/s}^2$$

Question 4 b

What is the acceleration when a force of 2.0 N is applied to a ball that has a mass of 0.60 kg?

Need: acceleration (a)

How:

$$\text{acceleration (a)} = \frac{\text{force}}{\text{mass}}$$

Calculate

$$\text{acceleration (a)} = \frac{2.0 \text{ N}}{0.60 \text{ kg}} = 3.33 \text{ m/s}^2$$

8. Acceleration Definition

Q1: Acceleration is defined as the rate of change of an object's...

- A. Mass
- B. Position
- C. Velocity
- D. Distance

Q2: If a car is moving at a constant speed in a circle, is it accelerating?

- A. No, because the speed is constant
- B. Yes, because the direction is changing
- C. Yes, because the net force is zero
- D. No, because there is no friction

Q3: What must happen to an object for it to have zero acceleration?

- A. It must be at rest
- B. Its speed must be zero
- C. Its velocity must be constant
- D. It must be moving very fast

Q4: Which of these is an example of acceleration?

- A. A car driving on a straight road at 80 km/hr
- B. A parked motorcycle
- C. A train slowing down to enter the station
- D. A ball moving with zero net force

9. Definition of Force

Q1: In the most simple terms, what is a force?

- A. A speed or a velocity
- B. A distance or a displacement
- C. A push or a pull
- D. A time or a period

Q2: Which of these is NOT a type of force?

- A. Gravity
- B. Friction
- C. Volume
- D. Tension

Q3: What effect does a force have on a moving object?

- A. It always makes the object stop
- B. It can change the object's motion
- C. It always makes the object speed up
- D. It makes the object lose mass

Q4: The strength of a force is called its...

- A. Direction
- B. Magnitude
- C. Effect
- D. Type

Q5: Which instrument is used to measure the magnitude of a force?

- A. Measuring tape
- B. Balance/Scale
- C. Stopwatch
- D. Spring scale/Dynamometer

10. Force Affects Motion

Q1: What is needed to change the speed or direction of an object?

- A. Energy
- B. Mass
- C. Force
- D. Gravity

Q2: According to Newton's First Law, an object in motion will stay in motion unless what happens?

- A. It runs out of fuel
- B. An unbalanced force act on it
- C. Its mass changes
- D. The object slows down

Q3: When all forces on an object are balanced, the object's motion will....

- A. Increase quickly
- B. Stop immediately
- C. Stay the same
- D. Change direction constantly

Q4: A soccer ball rolls across a field and slowly stops. Which force caused the ball to change its motion and stop?

- A. Gravity
- B. Normal Force
- C. Friction
- D. Magnetic Force

Q5:

Question 19 a
4. A train moves at a constant speed down a straight track. Which of the following scientific explanations is true? A No forces act on the train as it moves. B The train moves because no forces are acting against it. C The forces of the train's engine balance the force of friction opposing it. D An unbalanced force keeps the train moving.

11. Net Force

Q1: What is the "net force" acting on an object?

- A. Only the pushing forces
- B. The force of gravity
- C. The sum of all forces acting on an object
- D. The weight of the object

Q2: If the net force on a box is zero, what is the box doing?

- A. It is accelerating quickly
- B. It is moving but slowing down
- C. It is staying still OR moving at a constant velocity
- D. It is increasing its mass

Q3: When the net force is greater than zero, the object is...

- A. Stopped
- B. Moving at a constant speed
- C. Accelerating
- D. Losing mass

Q4: An unbalanced force is required to change an object's velocity. What is an unbalanced force?

- A. A force acting only upwards

- B. A force that has no magnitude
- C. A net force of 0 N
- D. A net force that is not 0 N

12. Calculate Net Force

Q1: If two students push a box with forces of 15N and 10N in the same direction, what is the net force?

- A. 5N
- B. 25N
- C. 10N
- D. 150N



Q2: If the two students push the box with 15N and 10N in opposite directions, what is the net force?

- A. 5N
- B. 25N
- C. 10N
- D. 150N

Q3: To find the net force when two forces are moving an object in opposite directions, you must...

- A. Multiply the forces
- B. Add the forces
- C. Divide the forces
- D. Subtract the smaller force from the larger force

Q4: A block has a force of 100 N pulling it right and a friction force of 100 n pulling it left. What is the acceleration of the block?

- A. 200 m/s^2
- B. Cannot be determined
- C. Zero
- D. 10 m/s^2

Q5: A force 20N and a force of 130N act on an object. The maximum possible net force is...

- A. 5N
- B. 25N
- C. 10N
- D. 150N

13. Force, Mass, and Acceleration

Q1: If you apply the same force to a small car and a large truck, which one will have more acceleration?

- A. The large truck
- B. They will have the same acceleration
- C. The small car
- D. Neither will accelerate

Q2: What is the unit of measure for Force (F)?

- A. Kilogram (kg)
- B. Meter per second squared
- C. Newton (N)
- D. Meter (m)

Q3: The relationship between force and acceleration is...

- A. Inverse
- B. Not related
- C. Direct
- D. Exponential

Q4: If you double the mass of an object but keep the force the same, what happens to the acceleration?

- A. It doubles
- B. It stays the same
- C. It is cut in half
- D. It triples

Q5: If an 80 kg object is pushed with a force of 400 N, what is its acceleration?

- A. 5 m/s^2
- B. 32000 m/s^2
- C. 0.2 m/s^2
- D. 480 m/s^2

14. Friction

Q1: Friction is a force that always acts in which direction compared to the object's motion?

- A. The same direction
- B. Perpendicular
- C. Opposite direction
- D. Towards the center of the Earth

Q2: What is a common example of friction?

- A. A ball falling from a building
- B. Rubbing your hands together to create heat
- C. A magnet pulling metal
- D. A rocket launching into space

Q3: Friction is caused by the roughness or irregularities between...

- A. Air and water
- B. Two interacting forces
- C. Two surfaces in contact
- D. Mass and weight

Q4: Which type of surface would produce the LEAST amount of friction?

- A. Rough sandpaper
- B. Pavement
- C. Smooth ice
- D. Dry grass

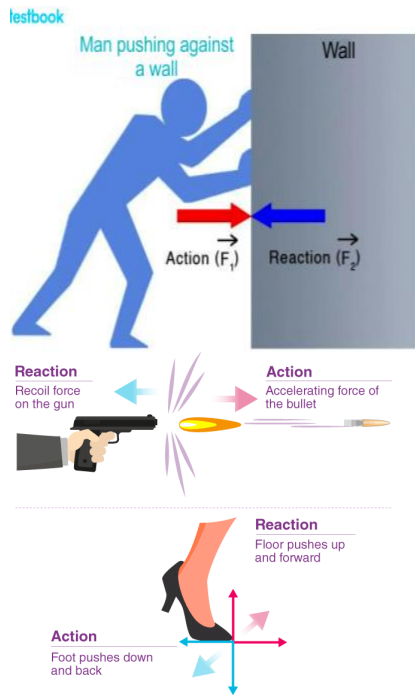
Q5: Air resistance is a type of friction that affects objects moving through...

- A. Solids
- B. Liquids
- C. Gases
- D. Vacuum

Unit 2 Lesson 3 summary:

Newton third law of motion

“Every action force has a reaction force equal in value and opposite in direction “

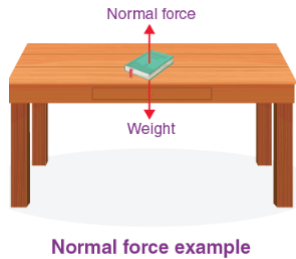


We call these “ action and reaction” forces → force pairs

قانون نيوتن الثالث:

“ كل فعل له رد فعل مساوي في القيمة و مضاد في الاتجاه ”

نسمي هذه القوى - force pairs



Normal force: Force exerted by a surface

- always perpendicular on the object
- always equal to weight in value but opposite in direction

Normal force

:القوة التي يمارسها السطح

دائما عمودي على الكائن

دائما يساوي الوزن في القيمة ولكن معاكس في الاتجاه

15. Newton's Third Law

Q1: Newton's Third Law is often called the Law of...

- A. Inertia
- B. Acceleration
- C. Action and Reaction
- D. Gravity

Q2: If you push a wall with a force of 10 N(Action), what is the force (Reaction) the wall pushes back on you with?

- A. 5N
- B. 20N
- C. 10N
- D. Zero force

Q3: In every interaction, forces occur in pairs. These pairs are equal in magnitude and...

- A. In the same direction
- B. Act on the same object
- C. Opposite in direction
- D. Always cause motion

Q4: When a rocket launches, the gas pushes down (Action). What is the Reaction force?

- A. The weight of the rocket
- B. Air resistance pushing down
- C. The rocket pushes the gas up
- D. The gas pushes the rocket up

Q5: A bird is flying. The action force is the bird's wings pushing down on the air. What is the reaction force?

- A. Air pushing the bird forward
- B. Air pushing the bird up
- C. Gravity pulling the bird down
- D. The bird pushes the air forward

Q6:

Question 20 b
4. Which of the following systems does NOT represent a force pair? - A When you push on a bike's brakes, the friction between the tires and the road increases. - B When a diver jumps off a diving board, the board pushes the diver up. - C When an ice skater pushes off a wall, the wall pushes the skater off of the wall. - D When a boy pulls a wagon, the wagon pulls back on the boy.

Question 17 b



Three-Dimensional Thinking

A person is applying a force to the right on an object as shown.
Use the model below to answer questions 2 and 3.



2. What forces are acting on the person?

- A a slightly smaller force to the left because the object is accelerating
- B a force equal to the force applied going to the left
- C a force to the right to apply the force to the object
- D a force to the right because the object is accelerating

Q7:

Unit 2 Lesson 4 summary:

Types of Forces

Contact forces: interactions between objects that touch



applied force



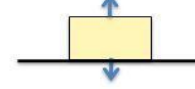
spring force



drag force



frictional force



normal force

Non-contact forces: attract or repel, even from a distance



magnetic force



electric force



gravitational force

Applied force: push or pull

Spring force: Force by a spring

Drag force: Force of air resistance

Frictional force: Force that opposes motion

Normal force: Force exerted by a surface

Magnetic force: Force by a magnet (opposites attract / similars repel)

Electric force: force of electric charge (opposites attract / similars repel)

Gravitational force: Force of gravity

Gravity: attraction force between any two objects with mass not just the earth.

Gravity is affected by two things:

1- Mass of two objects:

More mass → more gravity (Stronger force of gravity)

Less mass → less gravity (weaker force of gravity)

Mass and gravity are DIRECTLY PROPORTIONAL

القوة المطبقة: دفع أو سحب

قوة الربيع: قوة زنبرك

قوة السحب: قوة مقاومة الهواء

قوة الاحتكاك: القوة التي يعارض الحركة

القوة العادية: القوة التي تمارسها سطح

القوة المغناطيسية: القوة بواسطة المغناطيس (الأضداد تجذب / تتشابه صد)

القوة الكهربائية: قوة الشحنة الكهربائية (الأضداد تجذب / تتشابه الصد)

قوة الجاذبية: قوة الجاذبية

الجاذبية: قوة الجذب بين أي جسمين لهما كتلة وليس فقط الأرض.

تتأثر الجاذبية بأمريين:

1- كتلة جسمين:

كتلة أكبر (جاذبية أكبر (قوة جاذبية أقوى)

كتلة أقل (جاذبية أقل (قوة جاذبية أضعف)

الكتلة والجاذبية متناسبان طرديا

2- Distance:

More distance → further → less gravity (weaker force of gravity)

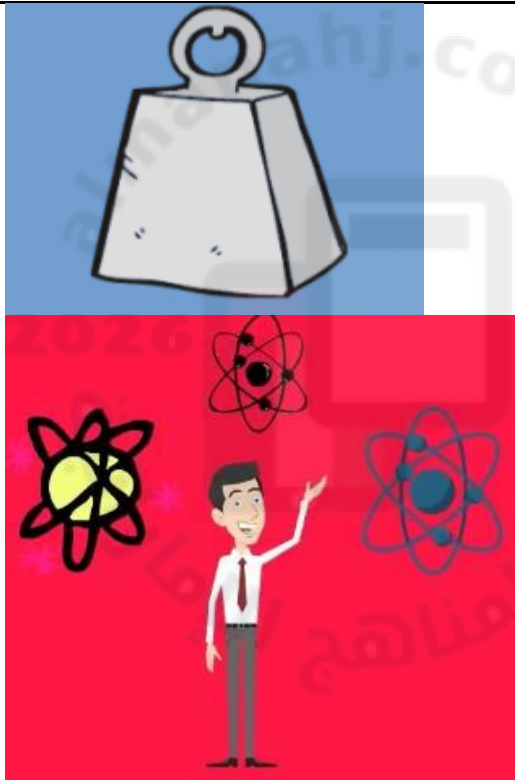
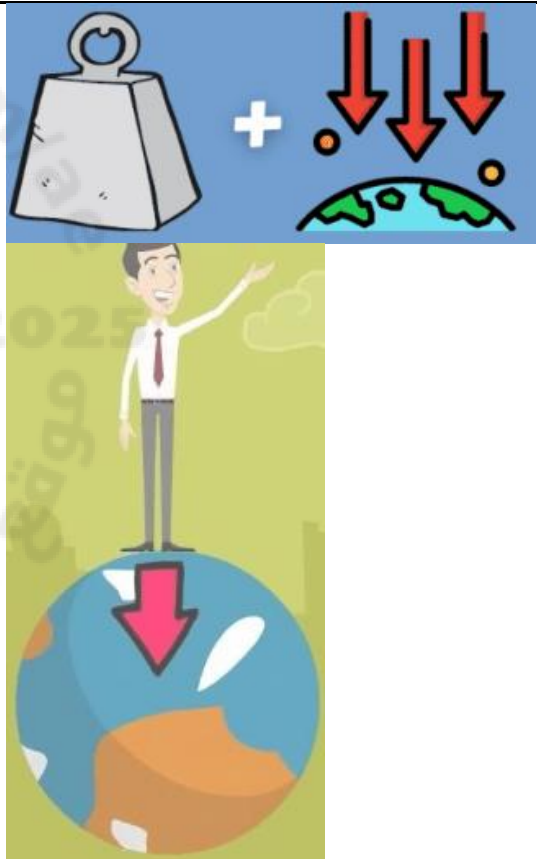
Less distance → closer → more gravity (stronger force of gravity)

Distance and gravity are **INVERSELY PROPORTIONAL**

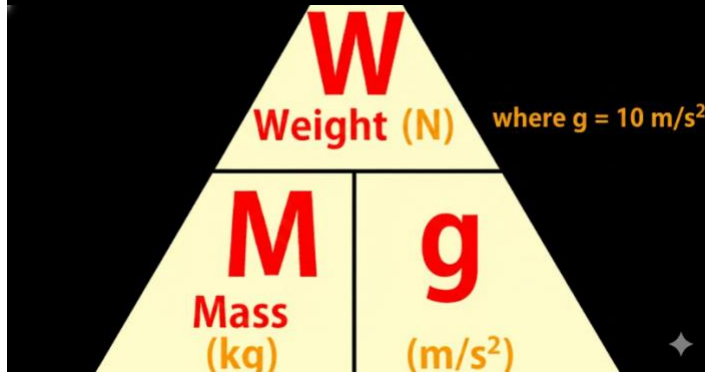
2- المسافة:
مسافة أكبر (أبعد) جاذبية أقل (قوة جاذبية أضعف)
مسافة أقل (أقرب) جاذبية أكثر (قوة جاذبية أقوى)

المسافة والجاذبية عكسية

Mass Vs Weight

	Mass	Weight
Picture		
Definition	Amount of matter (atoms) in an object	Force of gravity pulling down an object
Measured by	Digital balance / balance	Spring scale
Unit	Gram , Kilogram	N
Depends on gravity?	NO	YES
Constant / variable	CONSTANT	VARIABLE DEPENDING ON GRAVITY

Relationship between mass and weight:



$$W = M \times g$$

$$M = W / g$$

$$g = W / M$$

g is always 10 m/s^2

Question 8 a

If two objects of different masses are dropped from the same height in a vacuum, which one will hit the ground first? Explain why.

Both will hit the ground in the same time

Explanation:

- Both are affected by the **same force** giving the **same acceleration** 9.8 m/s^2
- No air resistance

Question 8 b

LAB Weighing Washers

8. **MATH Connection** Did you see a pattern in the ratios between mass and weight? Explain what you think this pattern means.

The ratio (division) between mass and weight is always the same and around 10 m/s^2

Question 15 a

A 10 kg object is resting on a flat surface. How would you calculate its weight?

Need: Weight

How:

$$\text{Weight} = \text{mass} \times g$$

Calculate:

$$\text{Weight} = 10 \text{ kg} \times 9.8 \text{ m/s}^2 = 98 \text{ N}$$

7. A pumpkin with a mass of 3 kg is at rest on top of a desk.
Calculate its weight.

Need: W

How:

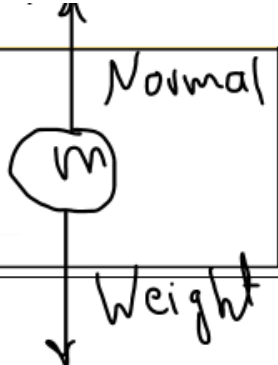
$$\text{Weight} = \text{mass} \times g$$

Calculate:

$$\text{Weight} = 3\text{kg} \times 9.8 \text{ m/s}^2 = 29.4\text{N}$$

MATH Connection For each of the systems below, calculate the weight of the object. Then, apply scientific understanding to draw a free-body diagram of the system.

A. A book with a mass of 2 kg is at rest on top of a desk.



Need: Weight

How:

$$\text{Weight} = \text{mass} \times g$$

Calculate:

$$\text{Weight} = 2\text{kg} \times 9.8 \text{ m/s}^2 = 19.6\text{N}$$

- How does the mass of an object affect the gravitational force it experiences?
 - More mass $\rightarrow$ more gravitational force.
- How does the distance between two objects influence the gravitational pull between them?

Increasing distance $\rightarrow$ gravitational force decreases
- Why do larger celestial bodies exert stronger gravitational forces?
 - Celestial bodies (earth, sun, planets) $\rightarrow$ high mass $\rightarrow$ high gravity
- How can we compare gravitational forces acting on different planets at equal distances?
 - At the same distance, a more massive planet pulls harder.
- How do you calculate the weight of an object using its mass and gravitational acceleration?
 - Weight = mass $\times$ g (on Earth $g \approx 9.8 \text{ m/s}^2$).

6. Why is the gravitational force between small objects difficult to observe?

- Small mass → small gravity

16. Gravitational Force

Q1: The gravitational force between two objects depends on two factors: mass and what else?

- A. Velocity
- B. Distance between them
- C. Volume
- D. Acceleration

Q2: How does increasing the distance between two objects affect the gravitational force between them?

- A. The force increases
- B. The force stays the same
- C. The force decreases
- D. The force changes direction

Q3: Gravitational force is always an attractive force. What does "attractive" mean?

- A. It pushes objects apart
- B. It only affects large objects
- C. It pulls objects together
- D. It changes the mass of objects

Q4: Which object in the solar system has the greatest gravitational force acting on Earth?

- A. The Moon
- B. Jupiter
- C. The Sun
- D. Mars

Q5: The force that pulls all objects toward the center of the Earth is called...

- A. Centripetal force
- B. Friction
- C. Normal force
- D. Gravity

17. Mass vs. Weight

Q1: What is the measure of the amount of matter (stuff) in an object?

- A. Weight
- B. Force
- C. Mass
- D. Volume

Q2: If you travel from Earth to the Moon, what property of your body will change?

- A. Mass
- B. Weight
- C. Volume
- D. Inertia

Q3: What is the unit of measurement for weight?

- A. Kilogram (kg)
- B. Gram (g)
- C. Newton (N)
- D. Meter (m)

Q4: Weight is defined as the force of gravity acting on an object's...

- A. Volume
- B. Density
- C. Mass
- D. Acceleration

Q5: A person's mass is 50kg. This mass will be the same whether they are on Earth or on Mars. This means mass is a/an. property.

- A. Variable
- B. Relative
- C. Constant
- D. Zero

Answer Key

1. Relative Dating

1. C - Relative dating
2. B - Preserved remains of ancient life
3. B - The Principle of Superposition
4. B - Relative age
5. B - The order in which things happened

2. Superposition Principle

1. B - Principle of Superposition
2. B - The layer on top
3. C - Sedimentary rock layers
4. C - No, because the layers are no longer undisturbed
5. C - Horizontally

3. Geological Record

1. C - To show the sequence of Earth's history
2. C - Rock layers
3. B - Physical and biological changes
4. C - Earth's history
5. C - Fossil record

4. Geological Time Scale

1. B - To organize Earth's 4.6 billion year history
2. C - Rock strata and fossils
3. D - Eon
4. B - Significant changes in life forms

5. C - To enhance understanding of Earth's history

5. Position and Motion

1. B - The location of an object
2. C - Motion
3. C - A location you choose to compare the object to
4. C - Displacement
5. C - Changes
6. TRUE
7. B - Reference point

6. Motion Graphs

1. B - The object is stopped
2. A - Constant speed
3. C - Speed
4. B - Going back
5. C - Quickly
6. A

7. Speed vs. Velocity

1. C - Speed
2. B - Velocity
3. B - Distance
4. D - Velocity

8. Acceleration Definition

1. C - Velocity
2. B - Yes, because the direction is changing
3. C - Its velocity must be constant

4. C - A train slowing down to enter the station

G. Definition of Force



1. C - A push or a pull
2. C - Volume
3. B - It can change the object's motion
4. B - Magnitude
5. D - Spring scale/Dynamometer

10. Force Affects Motion

1. C - Force
2. B - An unbalanced force acts on it
3. C - Stay the same
4. C - Friction
5. C

11. Net Force

1. C - The sum of all forces acting on an object
2. C - It is staying still OR moving at a constant velocity
3. C - Accelerating
4. D - A net force that is not 0 N

12. Calculate Net Force

1. B - 25N
2. A - 5N
3. D - Subtract the smaller force from the larger force
4. C - Zero
5. D - 150N

13. Force, Mass, and Acceleration

1. C - The small car
2. C - Newton (N)

3. C - Direct
4. C - It is cut in half
5. A - 5 m/s^2

14. Friction

1. C - Opposite direction
2. B - Rubbing your hands together to create heat
3. C - Two surfaces in contact
4. C - Smooth ice
5. C - Gases

15. Newton's Third Law

1. C - Action and Reaction
2. C - 10N
3. C - Opposite in direction
4. D - The gas pushes the rocket up
5. B - Air pushing the bird up
6. A
7. B

16. Gravitational Force

1. B - Distance between them
2. C - The force decreases
3. C - It pulls objects together
4. C - The Sun
5. D - Gravity

17. Mass vs. Weight

1. C - Mass

2. B - Weight



3. C - Newton (N)
4. C - Mass
5. C - Constant

