

## شكراً لتحميلك هذا الملف من موقع المناهج الإماراتية



## مراجعة شاملة وفق الهيكل الوزاري انسباير

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تاريخ نشر الملف على موقع المناهج: 2023-11-23 04:57:04 | اسم المدرس: Emam-El Aya

## التواصل الاجتماعي بحسب الصف الثامن



## روابط مواد الصف الثامن على تلغرام

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## المزيد من الملفات بحسب الصف الثامن والمادة علوم في الفصل الأول

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## EOT1 grade 8 inspire science 23-24

### MCQ Part

#### ✚ What is the basis for understanding earth's past?



1. Do you think the processes that form and shape the small stream bed and similar to those that form and shape the Grand Canyon? Why or why not?

- Yes, the water erosion that affects the stream is the same that affect the Grand Canyon.

2. How long do you think it would take to create a canyon as deep as the Grand Canyon? Explain your reasoning.

- Millions of years, because creating a canyon is gradual change that took millions of years.

➤ **Uniformitarianism:** states that geologic processes that occur today are similar to those that have occurred in the past.

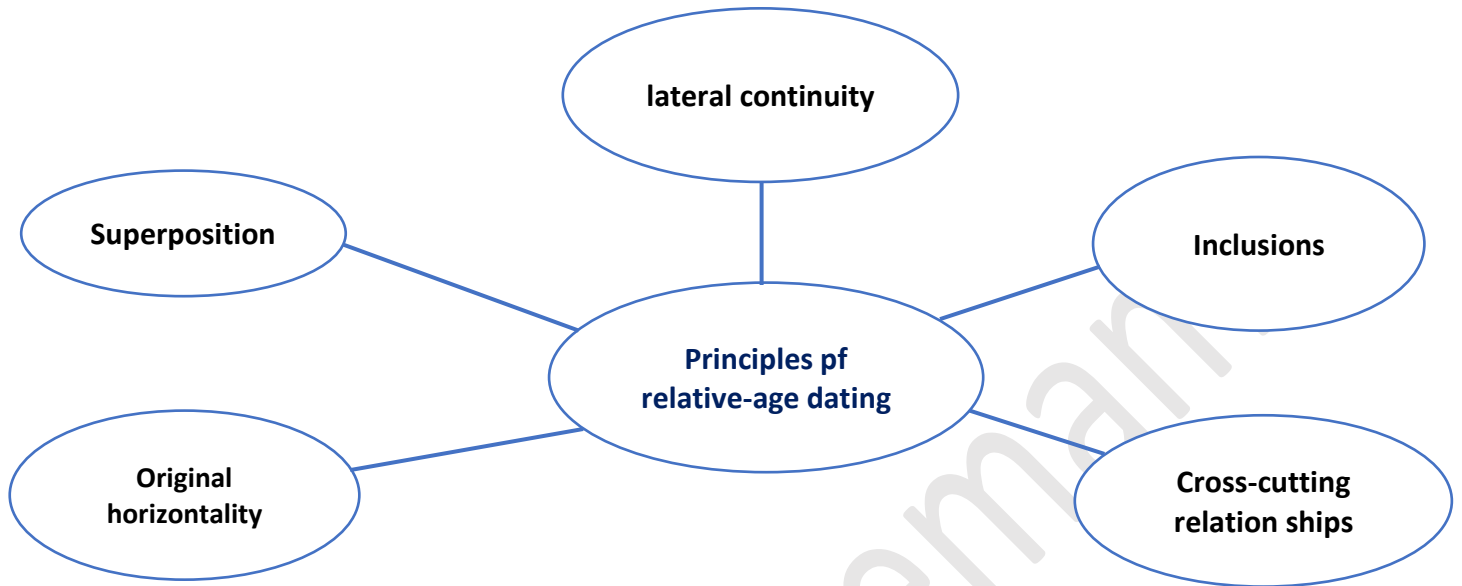
- Scientists use the principle of uniformitarianism to interpret earth's history suppose you discover a rock from an ancient beach, now imagine you are standing on that ancient beach, **what do you think you would see? Explain your answer relates to the principle of uniformitarianism.**

- Using the principle of uniformitarianism, the water erodes the beach today like erosion that happen in the ancient beach.
- Because of uniformitarianism, scientists can learn about earth's past by studying the present, one way to do this is by studying the order in which geologic events occurred using a method called relative-age dating. This does not allow scientists to determine the **absolute age, or the actual age of the events**. But it gives scientists a clearer understanding about geologic events in earth's history.





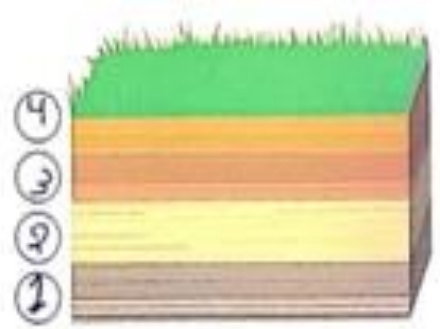
What are the principles of relative-age dating?



which principle did you apply in step 2 of the investigation?

- Superposition

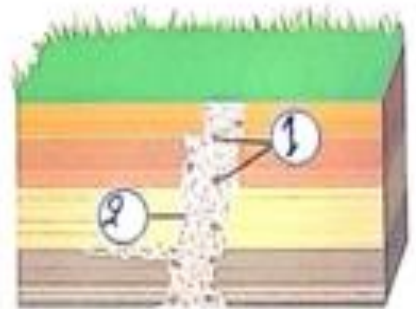
Using this principle, assign the rock layers in the diagram to the right their relative ages from oldest (1) to youngest (4).



Which principle did you apply in step 4 of the investigation?

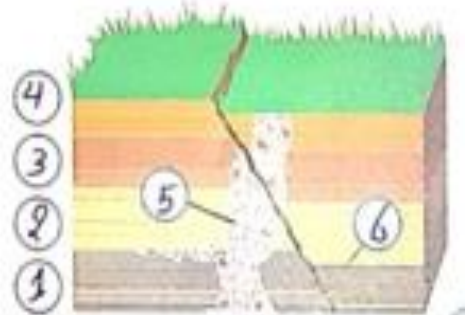
- Inclusion

Using this principle, label the older feature 1, and the younger feature 2 on the diagram to the right



Which principle did you use in step 6 of the investigation?

- Cross-cutting relationships





### ✚ The principles of relative-age dating:

1. **Superposition:** is the principle that in undisturbed rock layers, the oldest rocks are on the bottom.
2. **Original horizontality:** most rock-forming materials are deposited in horizontal layers.
3. **lateral continuity:** is the principle that sediments are deposited in large continuous sheets in all lateral directions.
4. **Inclusion:** if one rock contains pieces of another rock, the rock containing the pieces is younger than the pieces.
5. **Cross-cutting relationships:** if one geologic feature cuts across another feature, the feature that it cuts across is older.

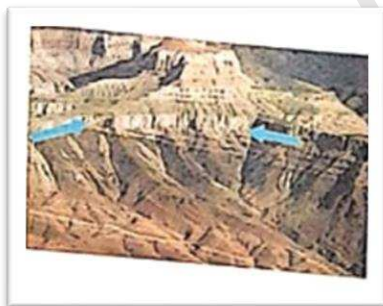
### ✚ What happens when the rock and fossil records are not complete?

#### ➤ Gaps in the rock record



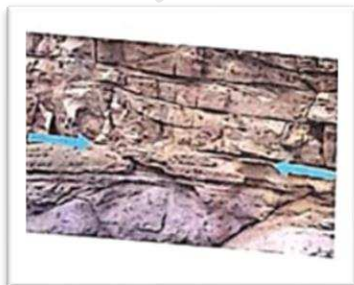
#### Disconformity

“Sedimentary rock layer overlies another sedimentary rock layer.”



#### Angular unconformity

“Sedimentary rock layer overlies tilted sedimentary rock layer.”



#### nonconformity

“Sedimentary rock layer overlies igneous rock layer.”



➤ What happens when the rock and fossil records are not complete?

- **Weathering, erosion, volcanism** and other processes are constantly changing earth's surface → this makes it difficult to find a sequence of rock layers that haven't been disturbed.

Sometimes, the rock record of a past event is completely eroded away.

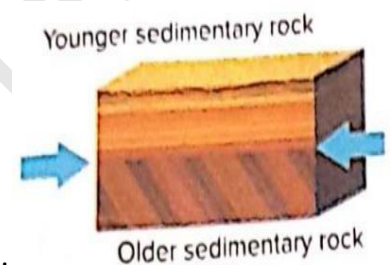
➤ Unconformities → breaks or gaps in the rock record

There are 3 types of unconformities:

1) **Angular unconformities**

when horizontal layers of sedimentary rock are deformed during mountainbuilding or other geologic events → they usually uplifted or tilted

later, layers of sedimentary rock are laid down on top of the tilted layers.

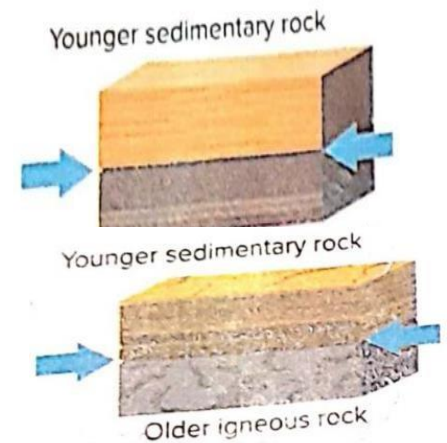


2) **Disconformities**

when horizontal layer of sedimentary rock overlies another horizontal layer of sedimentary rock that have been eroded.

3) **Nonconformity**

when a layer of sedimentary rock overlies a layer of igneous rock or metamorphic rock





## Module 2 {Natural Selection and adaptations}

### + The structure of DNA:

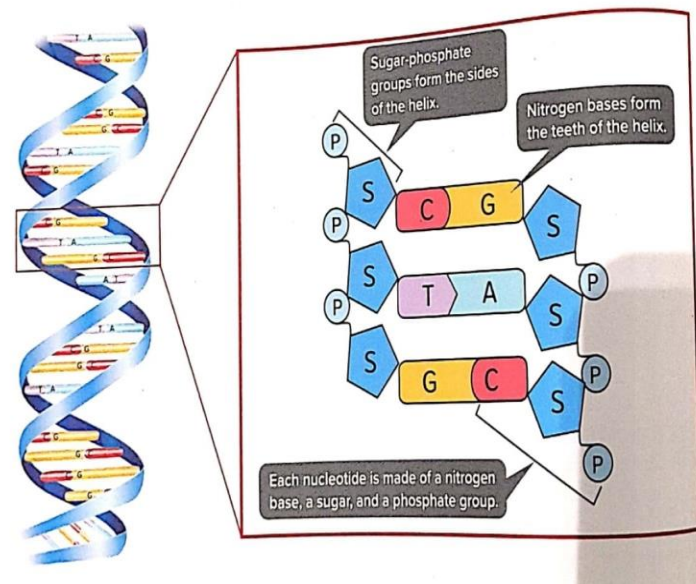
- Most of cells contains chromosome.
- Chromosomes are made of proteins and DNA.
- **DNA**: “an organisms’ genetic material”
- A gene: is a segment of DNA on a chromosome.
- Genes provide directions for a cell to express traits.
  - Strands of DNA in a chromosome, are tightly coiled like a telephone cord coiled spring.
  - This coiling allows more genes to fit in a small space. (Picture page 63)
- DNA is like a twisted zipper.
- Twisted zipper is called a double helix.  
(Picture page 64)

### + DNA shape:

- DNA twisted zipper shape is because of “**nucleotides**”.
- Nucleotides is a molecule made of a nitrogen base, a sugar and phosphate group.
  - Sugar called: “deoxyribose in DNA” and “ribose in RNA”.

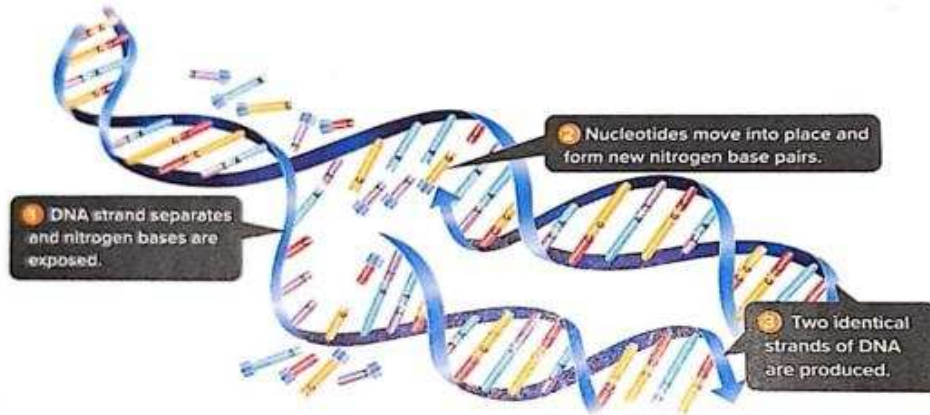
### ➤ Four nitrogen bases in DNA:

- Adenine(A)                      -Thymine(T)
- Guanine(G)                    - Cytosine(C)



➤ **In RNA:**

- Adenine(A)                      - Uracil(U)
- Guanine(G)                    - Cytosine(C)

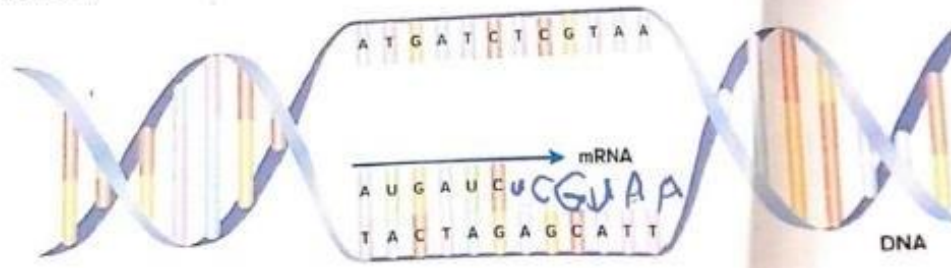


- \* **A and T always bond together.**
- \* **C and G always bond together.**

**\* Transcription**



Based on the animation and the figure, complete the DNA to mRNA transcription below. Use the blue lines to write your answer.



- \* The process of making RNA from DNA is called **"Transcription"**.



### Difference between DNA and RNA

	DNA	RNA
Nitrogen base	✓ 4 nitrogen bases: - adenine(A) -Thymine(T). - guanine(G) - Cytosine(C).	✓ 4 nitrogen bases: -adenine(A) -Uracil(U). - guanine(G) - Cytosine(C).
Sugar	deoxyribose	Ribose
Strands	Double strands "Doublehelix"	Single strands
Types		mRNA – tRNA- rRNA
Definition	a type of a nucleic acid that carries genetic material	a type of a nucleic acid that carries the code for making proteins





## ✚ What are adaptations?

“**Adaptation**” is an inherited trait that helps a species survive in its environment.

## ✚ Types of adaptations:

- Scientists classify adaptations into three categories: structural, behavioral, and functional.

1. **Structural adaptations**: involve color, shape, and other physical characteristics.

**Ex:** the length of a tortoise’s neck is a structural adaptation.

- The jackrabbit’s powerful legs help it run fast to escape from predators.

2. **Behavioral adaptation**: involves the way an organism behaves or acts.

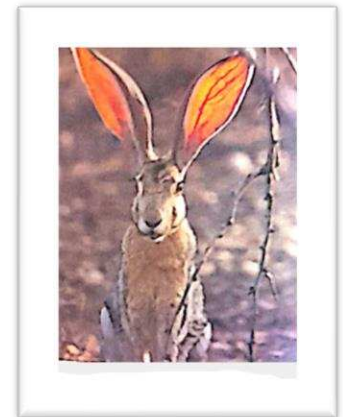
**Ex:** hunting at night and moving in herds are examples of behavioral adaptations.

- The jackrabbit stays still during the hottest part of the day, helping it conserve energy.

3. **Functional adaptations**: involve internal body systems that affect biochemistry.

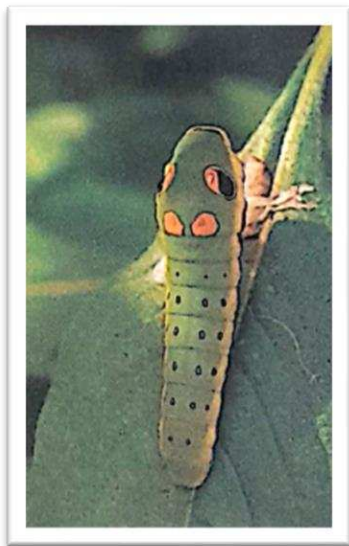
**Ex:** A drop in body temperature during hibernation is an example of functional adaptation.

- The blood vessels in the jackrabbit’s ears expand to enable the blood to cool before reentering the body.



## ✚ How do adaptations affect organisms?

**Environmental interactions**: many species have evolved adaptations that make them nearly invisible.



- The caterpillar in the photo resembles a snake.
- The resemblance of one species to another species is called “mimicry” (MIH mih karee).
- Camouflage and mimicry are adaptations that help species avoid being eaten.



- The snake in the photo is the same color as the leaves it is resting on, this is a structural adaptation called camouflage
- Camouflage: is an adaptation that enables a species to blend in with its environment.
- ❖ Environments are complex, species must adapt to an environment’s living parts as well as to an environment’s nonliving parts.

#### ✚ Nonliving things include:

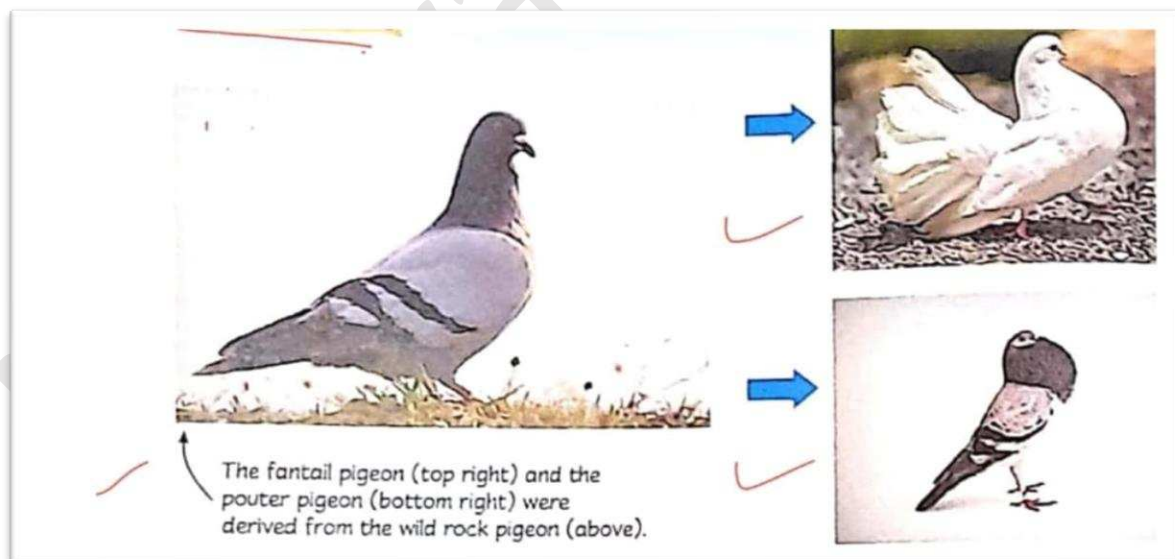
**1. Temperature 2. Habitat 3. Nutrients in the soil 4. Climate.**

- ❖ Camouflage, mimicry, and mouth shape are adaptations mostly to an environment’s living parts.
- ❖ Living and nonliving factors are always changing, environmental changes affect how species adapt, If a species is unable to adapt, it becomes extinct.



## ✚ How can traits be directly influenced?

- Adaptations provide evidence of how closely Earth's species match their environments.
- Darwin's theory of evolution by natural selection predicted. When humans influence traits in other organisms. It is called **"artificial selection"**.
- The selection and breeding of organisms with desired traits is called **"selective breeding"**.
- **Selective breeding:** sometimes referred to as artificial selection, is similar to natural selection except that human, instead of nature, do the selecting.
- By breeding organisms with desired traits. Humans change traits just as natural selection does. Cows with increased levels of milk production, dogs of different sizes, and roses of unique colors are products of selective breeding.



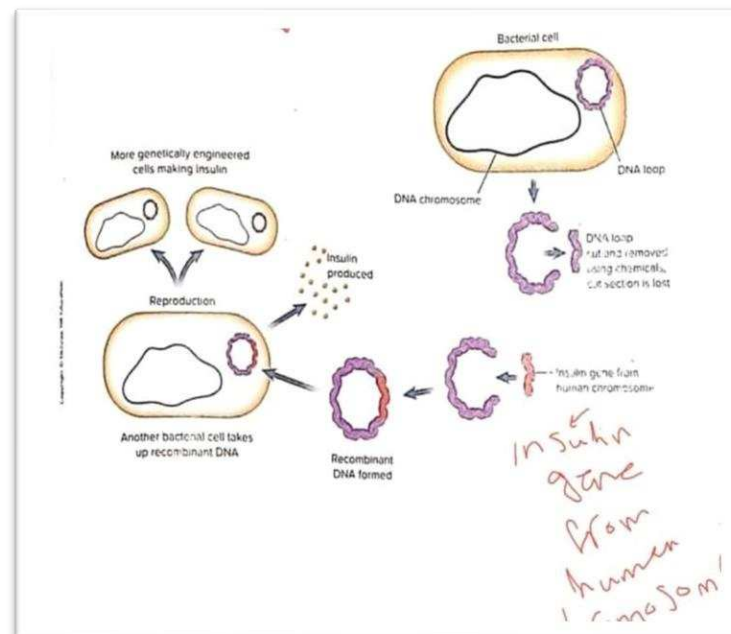


➤ **Can traits of organisms always be predicted selective breeding? Explain how multiple causes can influence the traits of an organism.**

- No, we can predict traits because of mutation.
- Genetic and environmental factors influence the traits.

✚ **What is genetic engineering?**

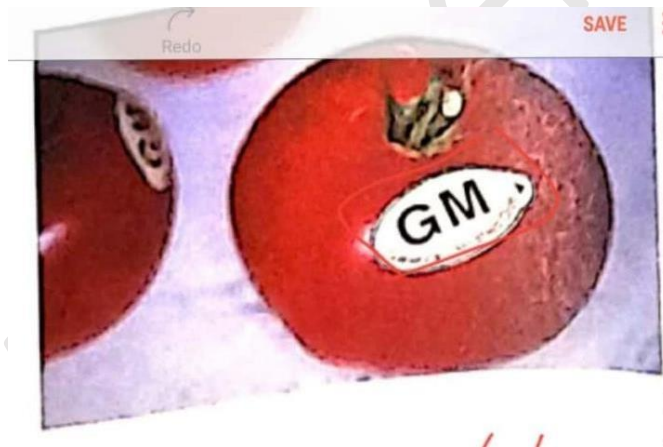
- Scientists are experimenting with **genetic engineering**, which refers to biological and chemical methods that change the arrangement of DNA that makes up a gene.
- Genetic engineering is already used to help produce large volumes of medicine. Genes also can be inserted into cells to change how those cells perform their normal functions.
- **Recombinant DNA** making recombinant DNA is one method of genetic engineering.
- Recombinant DNA is made by inserting a useful segment of DNA from one organism into a bacterium, large quantities of human insulin are made by some genetically engineered organisms.
- ✓ **People with type 1 diabetes need this insulin because their pancreases produce little to no insulin. Another use includes the production of chemicals to treat cancer.**





## ✚ What is a genetically modified organism?

- **Genetic engineering** can produce improvements in crop plants. *Such as:* corn, wheat, and rice. Food products that have been genetically engineered are commonly referred to as genetically modified organisms. Or **GMOs**.
- Scientists have made genetically engineered tomatoes with a gene that allows tomatoes to be picked while green and transported great distances before they ripen completely. Ripe, firm tomatoes are then available in the local market. Some crops are even engineered to be toxic to particular insects and pests.





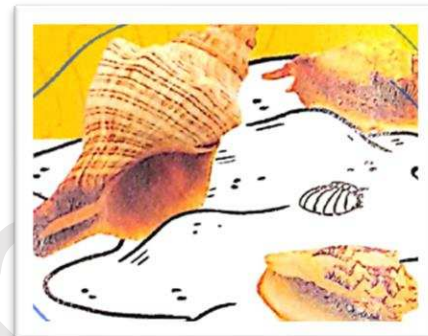
## *Module: Evidence of evolution*




### ✚ How do fossil form?

Know that fossils are the remains or evidence of once living organisms, evidence from fossils helps scientists understand how organisms have changed over time.

### ✚ Fossil formation:

When plants and animals die, any soft tissues animals do not eat are broken down by bacteria, only a dead animal's **hard parts** such as bones, shells, and teeth, remain.



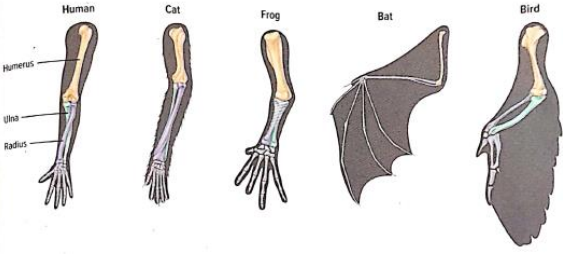


Fossil type	Description	Example
<b>1. Mineralization</b>	Water and minerals replaced the Internal structures of an organism	
<b>2. Carbonization</b>	In carbonization, pressure drives off a dead organism's liquids and gases. Only the carbon outline, or film, of the organism remains made by carbonization are usually black or dark brown.	
<b>3. Molds and casts</b>	When sediments harden around this buried Trilobite, a mold formed. If a <b>mold</b> is later filled with more sediments that Harden, the mold can form a <b>cast</b> .	 <b>(Trilobite fossil)</b>



➤ How are human's arm and a bird's wing related?

❖ Comparative anatomy

**Comparative anatomy** is the study of similarities and differences among structures of living and fossil species.

Homological structure	Analogical structure	Vestigial structure
<p>1. Are body parts of structures that were inherited by two or more species from a common ancestor.</p> <p>2. Similar in structure, difference In function.</p> 	<p>1. Analogical structures evolved separated from one another and organism with The structures do not share a closely related common Ancestor.</p> <p>2. Similar in function, different in structure.</p> 	<p>1. Are body parts that have lost their original function through evolution.</p> <p>2. The best explanation or Vestigial structures is that The species with a vestigial Structures is related to an Ancestral species that used The structure for a <b>specific purpose</b>.</p> <p><b>Ex:</b> the flightless cormorant, Evolved in an isolated ecosystem The Galapagos islands-that did Not have any predators on land.</p> <p>3. In that ecosystem, wings and the Ability to fly no longer gave Individuals an increased chance of survival and reproduction.</p> <p>4. Eventually, the flightless cormorant lost its ability to fly due to a wing size that is far too small to support a bird of its proportions.</p> 



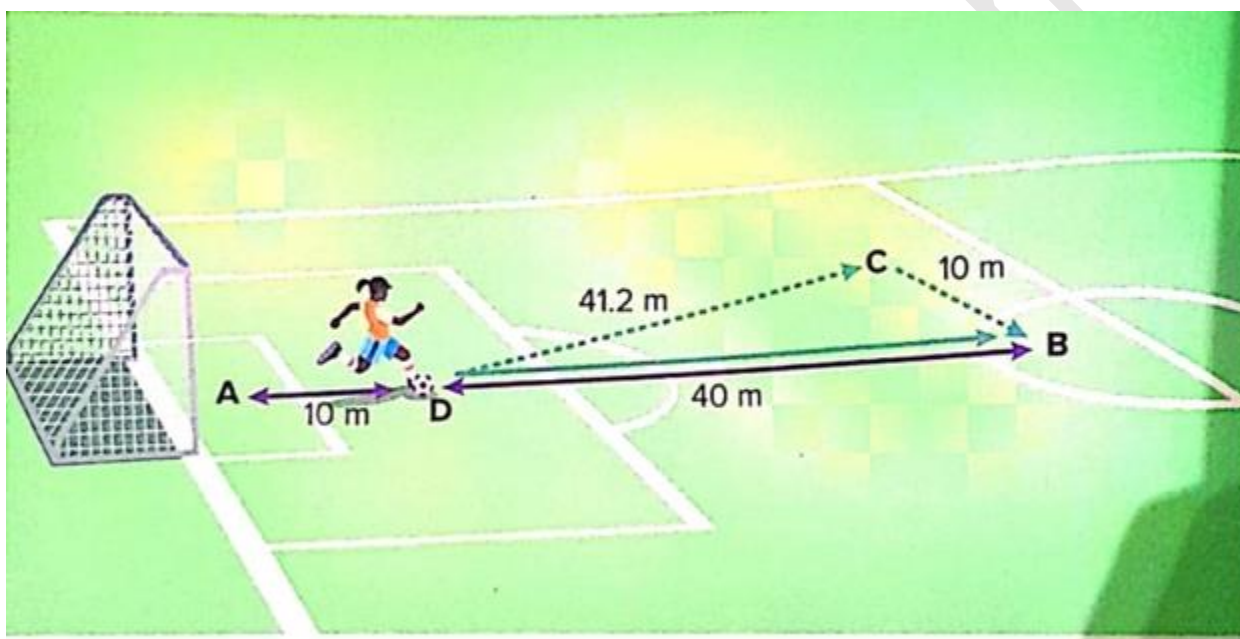
Research a vestigial structure present in a living organism. Explain how the vestigial structure arose while detailing how its function relates to its structure.

• **Example of vestigial structure:**

Human appendix and the pelvic bone of a snake.

➤ While an organism stop using this structure for long time it lost its ability to work.

➤ **Module: forces and motion**



✚ **distance and displacement:**

during one play in the soccer game the player runs 41.2 m from position D to position C, then she runs 10 m to position B, her path is shown by the green dotted lines, the total distance the player travels is  $41.2 \text{ m} + 10 \text{ m} = 51.2 \text{ m}$

**Displacement:** (is the difference between the initial, or starting, position and the final position).

- The player starts at point D and finishes at point B. her displacement is 40 m in front of her initial position. Displacement is the shortest distance between where the player started and the player's final position.
- An object's displacement and the distance it travels are not always equal. If the player





runs directly from points D to point A, then both the player's distance and displacement are the same quantity-10 m. if the player's final position is the same as her standing position, her displacement is 0m.

### Mathematical model:

**Newton's second law of motion** states that the acceleration of an object equals the net force on the object divided by the object's mass.

**Acceleration Equation**  
 $\text{acceleration (in m/s}^2\text{)} = \frac{\text{force (in N)}}{\text{mass (in kg)}}$   
 $a = \frac{F}{m}$

**In the PhET interactive simulation, a force of 100 N is applied to the wrapped present, giving it an acceleration of 2 m/s<sup>2</sup>. What is the mass of objects?**

$$a = \frac{f}{m} \quad 2 = \frac{100}{m} \quad m = \frac{100}{2} = 50 \text{ Kg}$$

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

$$a = \frac{f}{m} \quad 2 = \frac{2.0}{0.60} = 3.33 \text{ m/s}^2$$

### + **Newton's third law of motion:**

States that when an object applies a force on another object, the second object applies a force of the same strength on the first object, but the force is in the opposite direction.

#### + **Force pair:**

A force pair is the forces two objects apply to each other.

Force pairs are not the same as balanced forces. Balanced forces act on the same object. The force from gravity and the force from the floor act on the same object--you-- and are balanced.



In force pairs, each force acts on a different object. Look at the ball and the tennis racket below. The ball has the force of the racket pushing it.

The racket has the force of the ball pushing on it. The forces don't result in a net force of zero because they act on different objects. Adding forces can only result in a net force of zero if the forces act on the same object.



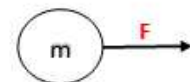
### Normal force:

Is the force that pushes perpendicular to the object's surface. When you push on the wall, the wall has a normal force that is pushing straight out from the wall. When a tennis ball hits a tennis racket, the racket applies a normal force perpendicular to the racket.

### Newton's third law:

states that when an object applies a force on another object, the second object applies a force of the same strength on the first object, but the force is in the opposite direction.

**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. 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



**3. The person is standing on ice with little to no friction. What will be the motion of the person applying the force to the object?**

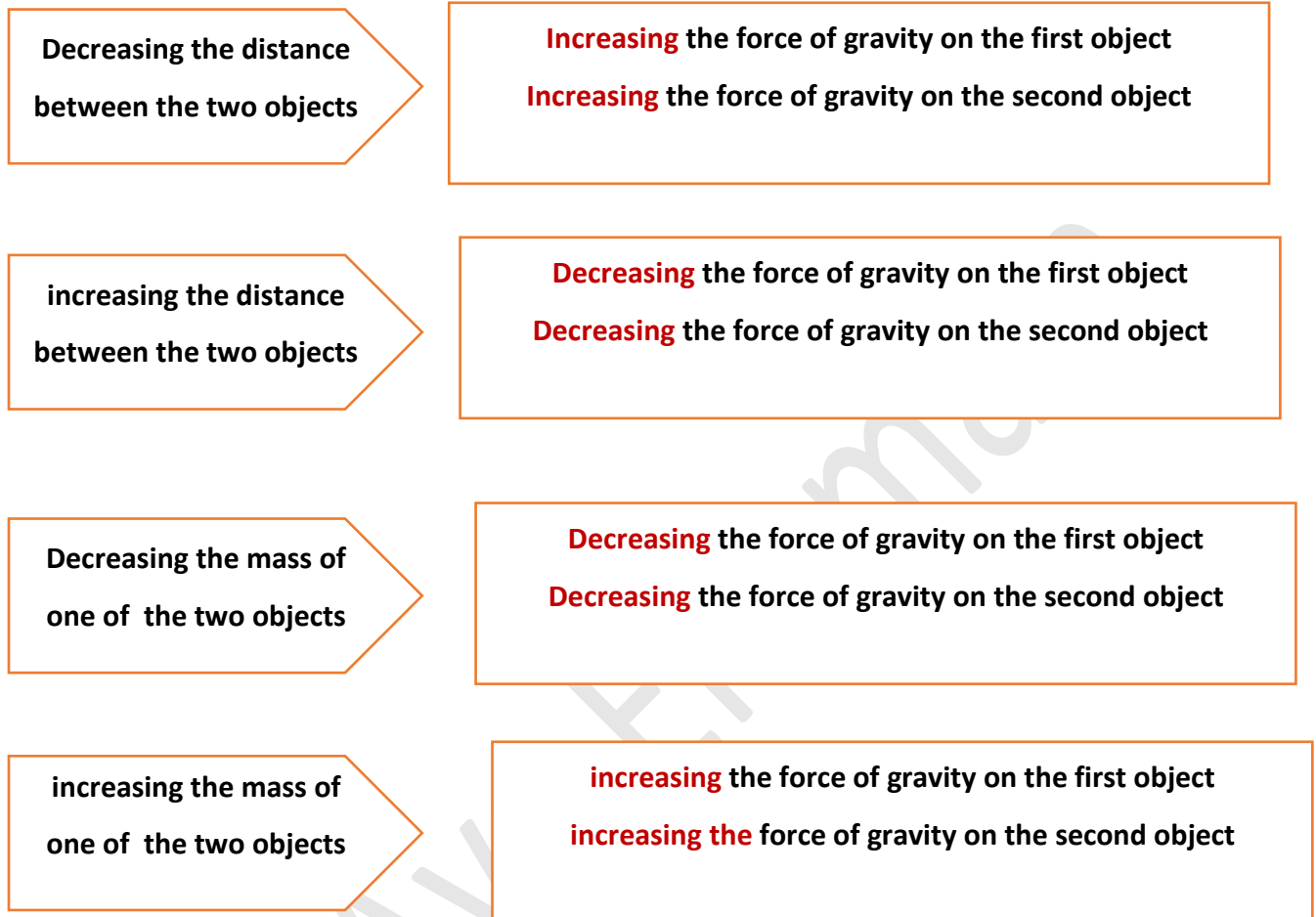
- A. begin to move to the right because that is the direction of the push
- B. no change in motion because the person is pushing the object
- C. begin to move to the left because the object pushes on the person**
- D. begin to move to the right with the object.

**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.



### The force of gravity:



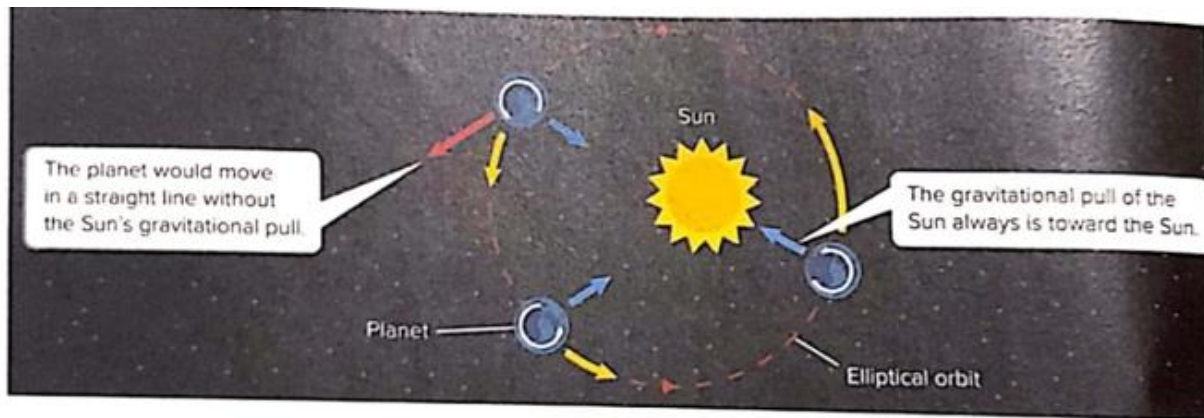
### ✓ Earth science connection:

The force of gravity played a major role in the formatting of **the solar system**.

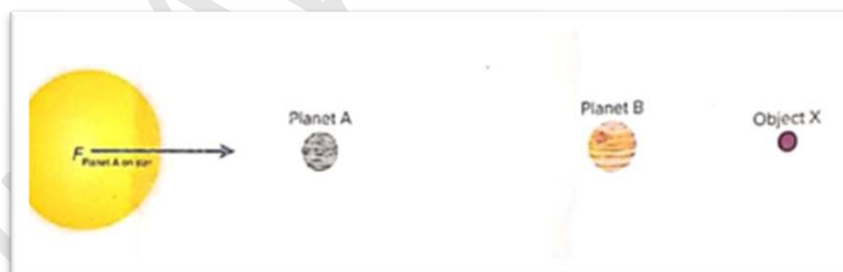
1. The solar system formed from a cloud of gas, ice, and dust.
2. Gravity pulled the materials closer together.
3. The cloud shrank and flattened into a rotating disk.
4. The center of the disk became denser, forming a star-the sun.
5. The planets began to take shape from the remaining bits of material.
6. Earth formed as gravity pulled these small particles together.
7. As they collided, they stuck to each other and formed larger masses.
8. The larger objects had more mass, so their gravity grew. This caused them to attract more particles,

eventually enough matter collected and formed earth.

9. Earth travels around the sun due to the gravitational force between the sun and earth. Everything in our solar system is held in orbit due to the gravitational force created by the sun. if the gravitational force disappeared, earth would break away from its orbit and continue traveling in a straight line into space.



- The model below represents a star orbited by two planets-planet A and Planet B. the star is also orbited by a mysterious object, object X, which entered into the star's gravitational field. The star is the most massive object, followed by planet B, Planet A, and object X. **Use the model to answer the questions:**



**3. In the model above, how is the mass of the objects represented?**

- A) The mass is represented by the size of the objects.
- B) The mass is represented by the distance between the objects.
- C) The mass is represented by the color of the objects.
- D) The mass is not represented.



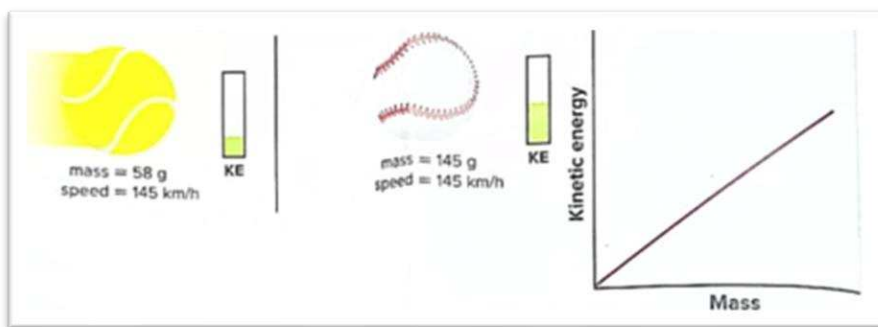
**4. The gravitational force from planet A on the star is shown in the model, how should the arrow that represents the gravitational force from the star on planet A be represented?**

- A) It should point from planet A toward the star and will be longer because the star has more mass.
- B) It should point from planet A toward the star and will be the same size because it is an equal and opposite force.
- C) It should point from planet A toward the star and will be shorter because planet A has less mass.**
- D) There is no arrow to represent because gravitational force is only in one direction.

### ❖ Module: mechanical energy

#### Kinetic energy and mass:

- ✓ A moving object's kinetic energy depends on its mass. If a baseball and a tennis ball move at the same speed, the object with more mass has more kinetic energy.
- ✓ Look at the figure below. Note the vertical bars. These are energy bars. Energy bars show relative amounts of energy. The more full the bar, the more energy the object has.
- ✓ The tennis ball and the baseball are traveling at the same speed, but the baseball has a greater mass. For objects traveling at the same speed, the more mass an object has, the greater its kinetic energy.



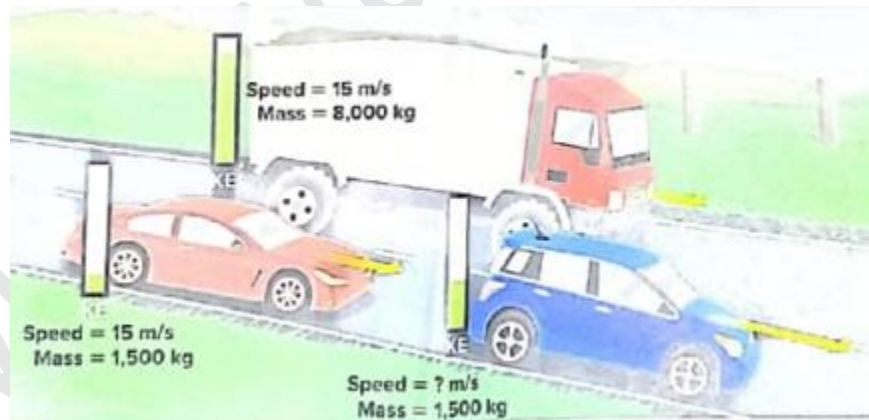
- ***The relationship between mass and kinetic energy is a proportional, linear relationship that can be described mathematically.***



2. Aiden collected canned goods for a neighborhood service project. He pulled a plastic wagon behind him to put the items in. From the time Aiden began until he finished collecting, the mass of the wagon tripled. The walk back to Aiden's house was downhill and the speed of the wagon tripled. What happened to the kinetic energy when the mass tripled? What happened to the kinetic energy when the speed tripled?

- A. When the mass tripled, the kinetic energy increased by a factor of 3, when the speed tripled, the kinetic energy increased by a factor of 3.
- B. When the mass tripled, the kinetic energy increased by a factor of 3, when the speed tripled, the kinetic energy increased by a factor of 9.**
- C. When the mass tripled, the kinetic energy increased by a factor of 9, when the speed tripled, the kinetic energy increased by a factor of 3.
- D. When the mass tripled, the kinetic energy increased by a factor of 9, when the speed tripled, the kinetic energy increased by a factor of 9.

The figure below shows mass and relative kinetic energy in energy bars for three vehicles.



3. What can you determine about the speed of the blue car?

- A. The blue car's speed is the same as the red car's speed.
- B. The blue car's speed is less than the truck's speed.
- C. The blue car's speed is equal to the truck's speed.
- D. The blue car's speed is greater than the red car's speed.**



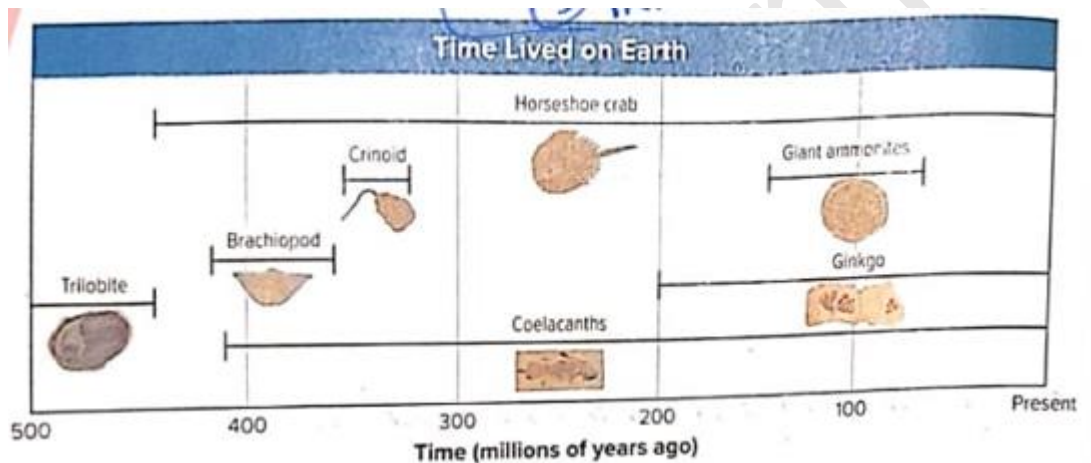
## Paper Part

**correlation**: the matching of rock layers or fossils exposed in one geographic region to similar layers or fossils exposed in other geographic regions.

The most useful fossils represent species that existed on earth for a short length of time were abundant and inhabited many locations.

These fossils are index fossils.

1. Existed on earth for a short time.
2. Abundant.
3. Inhabited many locations.



✓ **Which fossils could be index fossils? Explain your choices**

- 1- Crinoid
- 2- Trilobite
- 3- brachiopod
- 4- Giant ammonites

Because they lived for short periods of time.

✓ **Analyze the image below:**







1- Would you expect to find dinosaurs fossils in undisturbed rocks that are above the iridium layer? Explain your answer.

- No, because the layer above the iridium layer is younger, the iridium layer marks the mass extinction of dinosaurs.

2- How does the structure of a distinctive layer that is used as a marker determine its function?

- It can be used for correlation, and explain the principles of superposition. Layers above the distinctive layer are younger and layers under the distinctive layer are older.

➤ **Key bed:**

- A rock or sediment layer used as a marker in this way is called **a key bed.**
- Using the principle of superposition, geologists know that the layers above a key bed are younger than the layers below it.

## ◆ Mutation

- a permanent change in the sequence of DNA.
- Mutation occurs due to:
  - ✓ change in genetic material "DNA".
  - ✓ or by environmental factors such as exposure to x-rays, ultraviolet, radioactive, materials and some chemicals.

\* **Types of mutation:**

**1.Substitution:**

The C-G base pair has been replaced with a T-A pair.

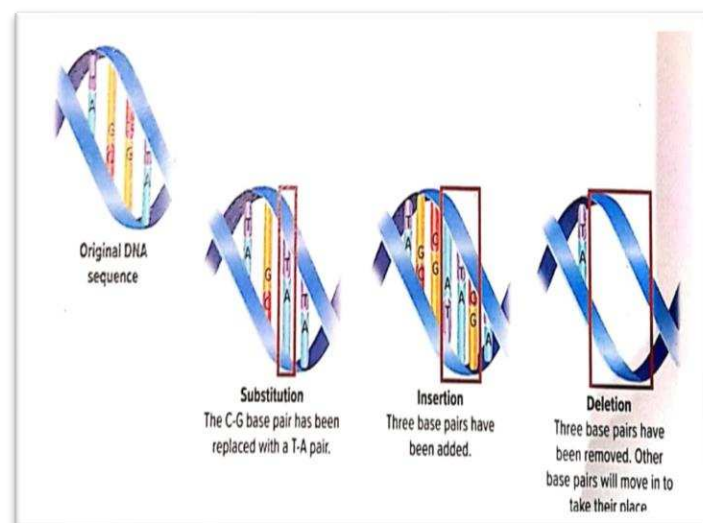
**2. INSERTION:**

Three base pair have been added.

**3.Deletion:**

Three base pair have been removed.

Other base pair will move in to take their place.





### ✚ What happens when a mutation occurs?

1. The effect of a mutation depends on where in the DNA sequence the mutation happens and the type of mutation.
2. Proteins express traits because mutation can change proteins, they can cause changes in traits, some mutations might cause a trait to change in a way that benefits the organisms, while others cause genetic disorders.

### ✚ Mutation Classification:

Mutation	Effects	positive	Negative	Neutral
Eye color	Genes for brown eyes are mutated and the individual has blue eyes.			✓
Lactose tolerance	Due to a mutation, human adults can process lactose unlike other mammals.	✓		
Color Blinders	Due to a mutation on the x chromosome, a person can not see certain colors.		✓	



**Questions:** use the diagram below to answer the following questions:



**1.** The diagram above shows a segment of DNA before and after the replication, which could have occurred as a result of this change in structure?

- A. changes to the genotype of the organism
- B. changes to the traits of the organism
- C. changes in the production of the organism
- D. all of the above

**2.** The mutation shown above resulted in muscle degeneration, The effect of this mutation is that muscles become progressively weaker. What type of mutation is this?

- A. Positive
- B. Neutral
- C. negative
- D. None of the above



➤ Tortoises look different depending on which island environment they inhabit.



### 1. Tortoise:

- Giant tortoises lived on many of the islands.
- When a resident told Darwin that the tortoises on each island looked different.

### 2. Finches:

- Many birds he collected were all species of finches despite their different appearances.

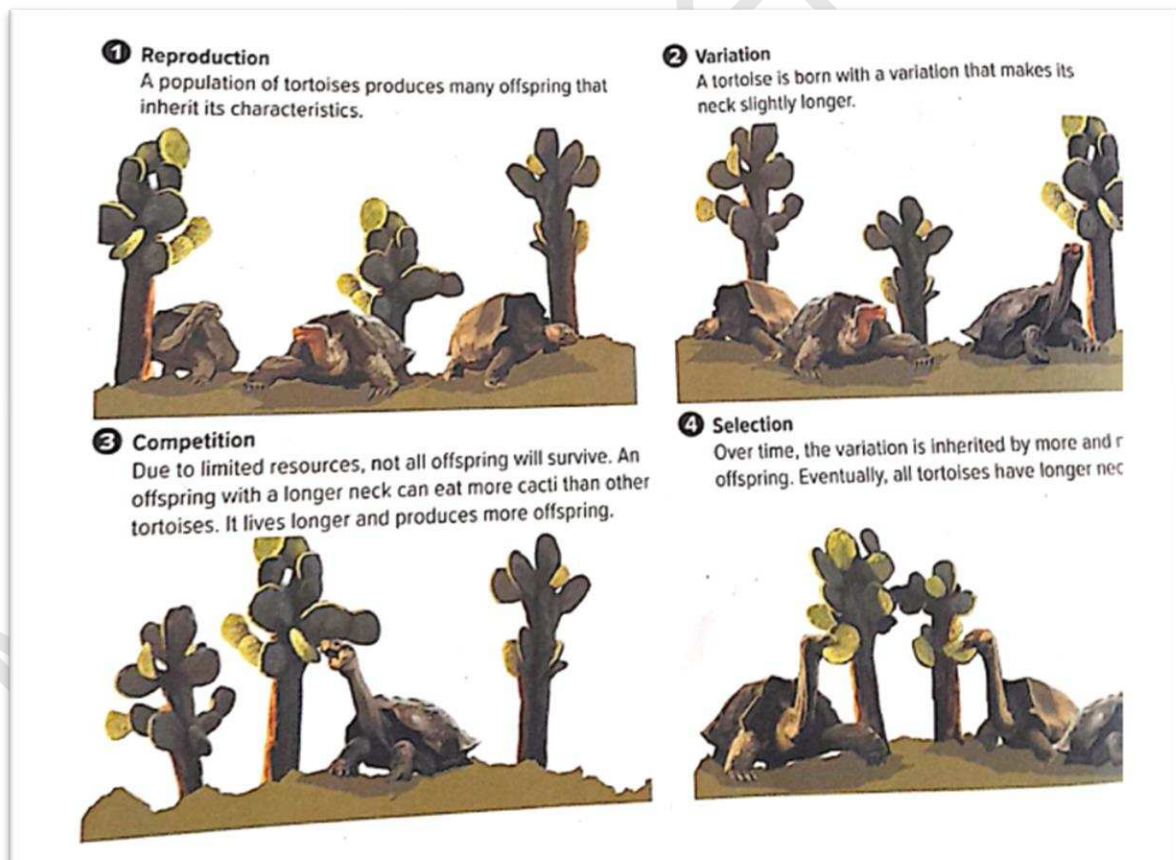
#### ❖ ... Traits and Environment:

- Tortoises with long necks and a large space between the shell and neck lived on islands with tall cacti.
- Their unique necks and shells let them reach high to eat the cacti.
- The tortoise with short necks and shells close to the neck lived on islands with plenty of short grass.



## + Variation and competition:

1. Darwin did not know about genes, but he realized that variations were the key to the puzzle of how populations of tortoises and other organisms evolved.
2. Darwin understands that food is a limiting resource, which means that the food in each island environment could not support every tortoise that was born, and tortoise had to compete with each other for food.
3. If a variation benefited a tortoise, allowing it to compete for food better than other tortoises, the tortoise lived longer, because it lived longer, it reproduced more, it passed on its variation to its offspring.

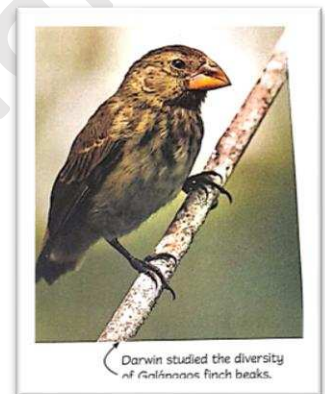




## ✚ Theory of evolution by natural selection:

- ◆ Natural selection is the process by which individuals with variations that help:
  1. Survive in their environments live longer.
  2. Compete better.
  3. Reproduce more than those that do not have the variations.
- ◆ It explains the process by which Galapagos tortoises became matched to their food sources.

✓ **Birds with beak variations that help them compete for food live longer and reproduce more.**



### **Explain the conditions that led to the changes in the tortoises on the galapagos island.**

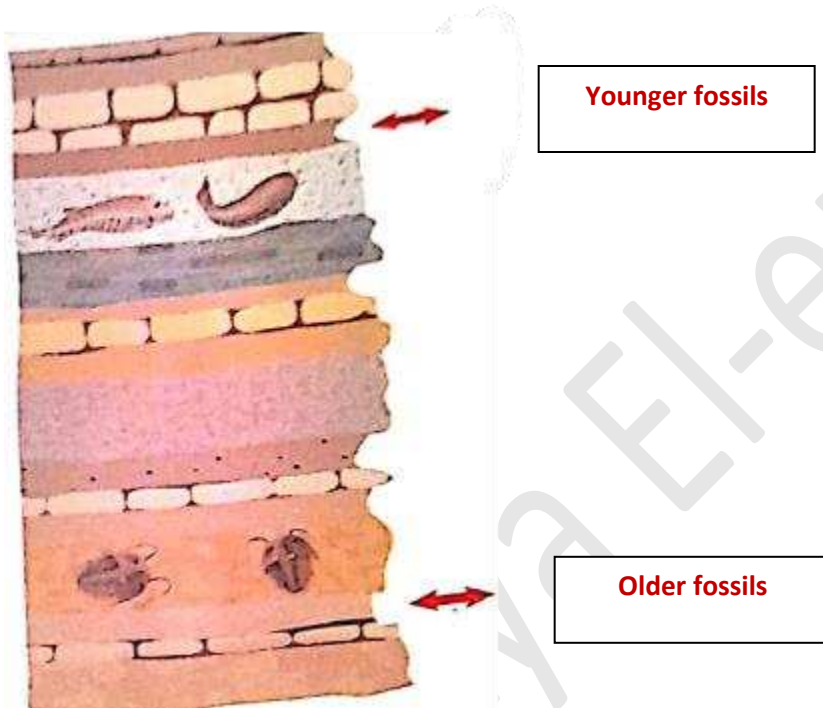
There were more offspring than could survive, variation in neck length and shell shape, and competitions for resources, which led to the tortoises with variations in neck length and shell shape to survive and reproduce, and the variations become more common over time.



### ✚ What can fossil tell us about time?

#### ✚ The fossil record:

- The fossil record is made up of all the fossils ever discovered on earth.
- It contains millions of fossils that represent thousands of species.
- Most of these species are no longer alive on earth.





- The fossil record documents the existence, diversity, extinction, and change of life forms throughout the history of life on earth.

➤ **Examine the table below to learn how scientists determine the age of fossil.**

Relative age dating	Absolute age dating <small>العمر المطلق بالسنوات</small>
<ol style="list-style-type: none"> <li>In relative age dating, scientists determine the relative order in which rock layers were deposited.</li> <li><b>In an undistributed rock formation</b>, they know that the <b>bottom</b> layers are <b>oldest</b>, and the <b>top</b> layers are <b>youngest</b>.</li> <li>Relative age dating helps scientists determine the relative order in which species have appeared on earth over time.</li> </ol>	<ol style="list-style-type: none"> <li>Absolute age dating is more precise than relative age dating. <small>العمر المطلق أكثر دقة من العمر النسبي</small></li> <li>Scientists take advantage of radioactive decay to learn a rock's absolute age or its age in years.</li> <li>In radioactive decay, unstable isotopes in rocks change into stable isotopes over time.</li> <li>Scientists measure the ratio of unstable isotopes to stable isotopes to find the age of a rock</li> </ol>

### ✚ Geologic time

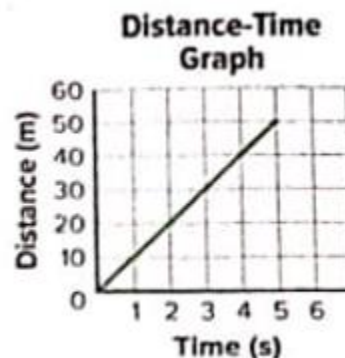
**Geologic time scale** is a chart that divides earth's history into different time units, the longest time units in the geological time scale are **eons**.

Earth's history is divided into **four eons**, earth's most recent eons the Phanerozoic, eon-is subdivided into **three eras**.

**Eons** → **eras** → **periods**

### ✚ Distance – time graphs:

- The plot you made in the investigation plot it is a distance time graph. This type of graph shows how an object's position changes during each time interval. A distance time graph does not show you the actual path the object took.



- Did you notice that the line through the points in the investigation wasn't completely straight? When an object is moving at a constant speed, the line will be straight. The steeper the line, the greater the slope, which means the greater the speed of the object.





- If the slope of the line changes, this means the speed of the object has changed, even if the speed has changed, the average speed can still be calculated.

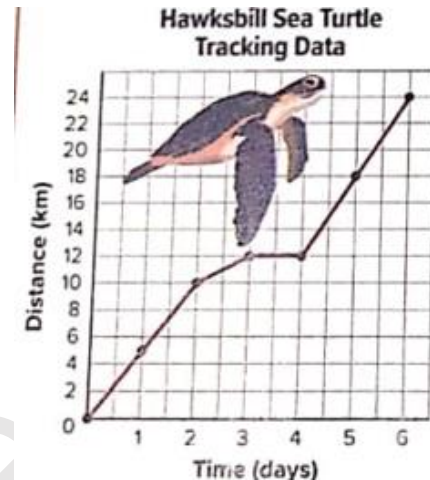
Analyze the data, determine the speed of the hawksbill sea turtle during each interval listed below.

$$\text{Day 0 to day 2: } \frac{10}{2} = 5 \text{ Km/d}$$

$$\text{Day 2 to day 3: } \frac{12-10}{3-2} = \frac{2}{1} = 2 \text{ Km/d}$$

$$\text{Day 3 to day 4: } \frac{12-12}{4-3} = \frac{0}{1} = 0 \text{ Km/d}$$

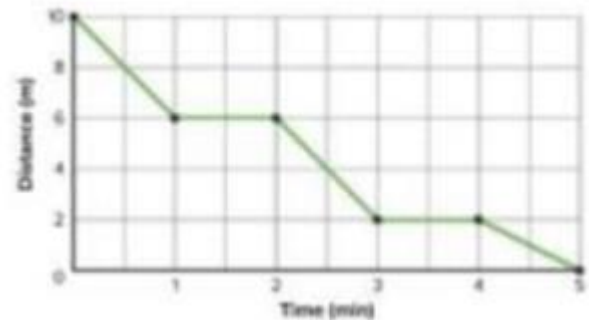
$$\text{Day 4 to day 6: } \frac{24-12}{6-4} = \frac{12}{2} = 6 \text{ Km/d}$$



#### ✚ Real world connection:

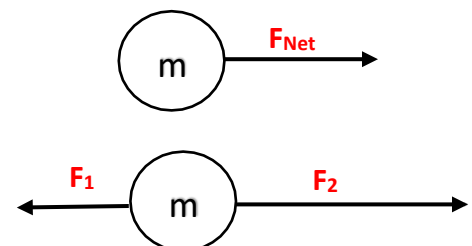
**Interpret data:** the plot below shows the motion of an elevator.

The elevator went down 4m at a constant speed for 1 min, it then stopped for 1 min. it went down 4 m in 1 min, stopped for 1 min and went down 2 m in the final minutes.



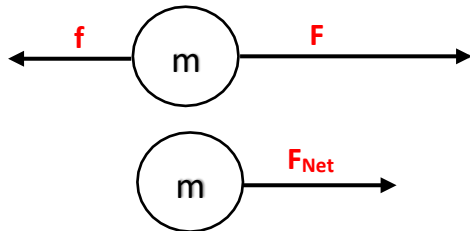
#### ❖ Net Force

- ✓ Is the sum of all the forces acting on an object. To model the net force, simply add together the forces in the same direction and subtract the forces in the opposite direction.

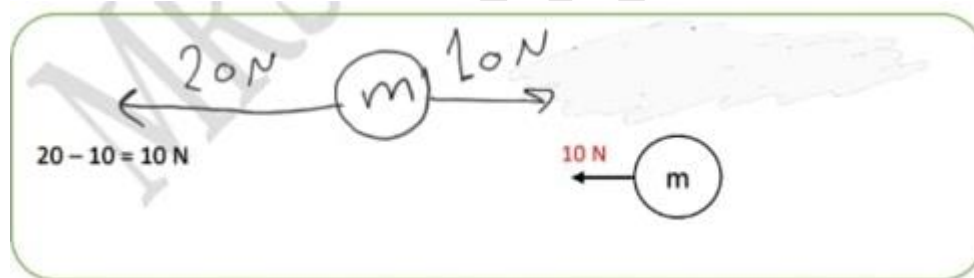




- ✓ Make a free-body diagram for the net force on the object shown below. The object is sliding across a surface with friction.



4. An object is pushed to the right with 10 Newtons of force, and pulled to the left with 20 Newtons. Sketch a free-body diagram of this system, and draw a diagram with the net force. Ignoring friction, identify the direction and motion of the object.



- The motion of an object is determined by the sum of the forces acting on it. If the total force on the object is not zero, its motion will change.

#### ✚ **Balanced and unbalanced forces:**

**Balanced force:** are forces that cancel each other. The only way for a team to win is to have unbalanced forces. When one team pulls harder than the other team.

When the forces are **unbalanced**, the rope and everyone holding it will accelerate in the direction of the net force.

Mrs. Aya El-emam