



وزارة التربية والتعليم
MINISTRY OF EDUCATION



AL SALAMAT SCHOOL
CYCLE 3 - AL AIN

Science Final Revision

(EOT Assessment Preparation)

Grade 8 Term 3 (2024-2025)

Mr. Issa Waswas

الأسئلة الموضوعية (اختيار من متعدد)

MCQs

SwiftAssess

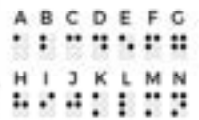
Q1) Explore different ways that information can be encoded and transmitted, while obtaining, evaluating, and communication information about the role of science in developing and using information technologies.

There are different **types of signals** used to **send information** such as:

Verbal speech

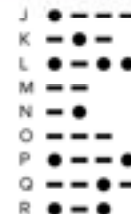
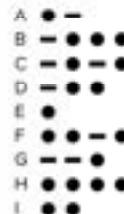
Reading a text

Braille



how can you **send a signal** to **someone far away**?

By using a **flashlight**, A quick flash of light represents a dot, and a longer flash represents a dash, just like in **Morse code**.



What are the **benefits of using a flashlight** to send messages?

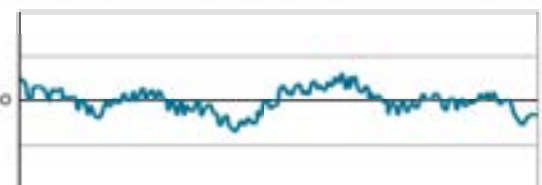
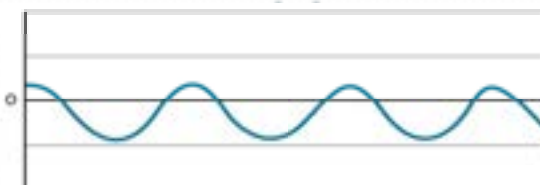
The flashlight made **the message clear and instant**. There was **no delay**, and the light was **easy to see**, even from far away.

Prepared by Mr. Issa Waswas

Q2) Explore different ways that information can be encoded and transmitted, while obtaining, evaluating, and communication information about the role of science in developing and using information technologies.

Remember: Noise is the **unwanted or unavoidable** modification of a signal.

- ☐ Some noise is **unavoidable**.
- ☐ As a **wave** moves **farther away from its source**, it can mix with other signals.
- ☐ This causes slight **variations** in the **original signal**.
- ☐ The **information** in signals **deteriorates as noise increases**.



Noise decreases the quality of signals.

Prepared by Mr. Issa Waswas

Q3) Compare digitized signals to analog signals, constructing explanations about how noise can cause an analog signals to degrade over time, whereas a digital signal can be reproduced and transmitted consistently.

Question: A **speedometer** in a car is designed to tell you how fast the car is moving at all times. **Construct an explanation about what the information represents.**



Answer: The information represents **the speed of the car**. It is **analog information** because the **speed is continuously changing** over time.

Prepared by Mr. Issa Waswas

Q4) Compare digitized signals to analog signals, constructing explanations about how noise can cause an analog signals to degrade over time, whereas a digital signal can be reproduced and transmitted consistently.

Analog Signal	Both	Digital Signal
Continuous	<input type="checkbox"/> Transmit information <input type="checkbox"/> <u>affected by noise</u> <input type="checkbox"/> Can be <u>encoded and stored</u> .	Discrete
Range of values		Two values only
More affected by noise		Less affected by noise
Old radios		Computers

Prepared by Mr. Issa Waswas

Q5+6) learn how people use resources and how increased consumption of resources affects Earth's systems. They will use evidence to explain how activities and technology can mitigate the negative impacts on earth.

Question: What types of **technologies and activities** help mitigate the **effects of changes in Earth's systems**?



Answer: Conservation **drones**, **Renewable** resources, **Fertilizers**, and **Public transportation**

Question: Evaluate the impact on land, water, and/or the atmosphere of an **activity you perform daily** that requires the **consumption of natural resources**. How could you **minimize these effects**?



Answer: Riding the school bus impacts the environment by **using fuel** that causes **air pollution** and materials that require **energy and mining**.
To reduce these effects, I could **walk or bike to school**.

Prepared by Mr. Issa Waswas

Q7+8) Explore Earth's motion and the seasons. Develop and use models to explain how earth's rotation, revolution, and tilted axis cause the patterns of the seasons, day and night, and the apparent motions of the sun, Moon, and stars.



THREE-DIMENSIONAL THINKING

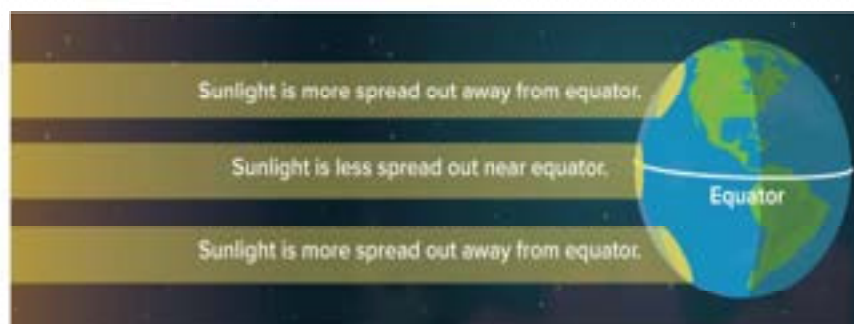
How does the varying amount of the Sun's solar energy **cause** the seasons? What **effects** does the tilt of Earth's rotation axis have on the seasons?



Answer: **Earth's tilted axis** causes the seasons by **changing how much sunlight** each hemisphere gets as **Earth move around the Sun**. (Remember it's all about revolution + tilted axis)

➤ **Equator** → (**less tilted**) Sunlight hits **directly** → (smaller area) → **Warmer**

➤ **Poles** → (**more tilted**) → **Spread out** over larger area → **Colder**



Prepared by Mr. Issa Waswas

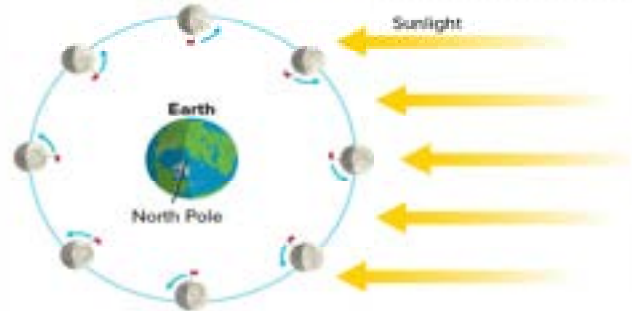
Q9+10) Students will explore the phases of the Moon. They will develop and use models to explain how the Moon's revolution relates to the pattern of lunar phases.

Question: Where does the **Moon receive its light**?



Answer:
The moon **does not** make its own light.
It **reflects light from Sun**.

Question: How can the Moon be **rotating** if the **same side of the Moon is always facing Earth**?



Answer:
The Moon makes **one rotation** in the same amount of time it takes to make **one revolution** around Earth (27.3) days.

Prepared by Mr. Issa Waswas

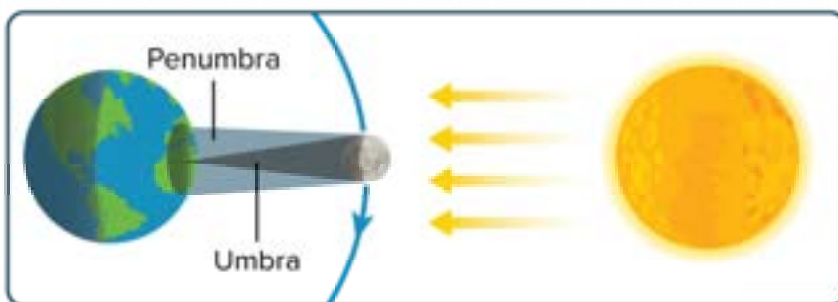
Q11) Explore eclipses of the Sun and the Moon. Develop and use models to explain how the motions of Earth and the Moon relate to the pattern of solar and lunar eclipses.

Solar Eclipse

New Moon Phase



What is **necessary** for a **solar eclipse** to take place?



- The **Moon** passes **between Earth and the Sun**.
- **Earth, the Moon, and the Sun** are **lined up**.
- the **Moon** casts a **shadow** on **Earth's surface**.
- a **solar eclipse** is occurring

- ☐ The **umbra** is the **central, darker part** of the shadow where **light is totally blocked**.
- ☐ The **penumbra** is the **lighter part** of a shadow where light **is partially blocked**.

Prepared by Mr. Issa Waswas

The Sun's Changing Appearance During a Total Solar Eclipse



The Motion of the Moon in the Sky During a Total Solar Eclipse



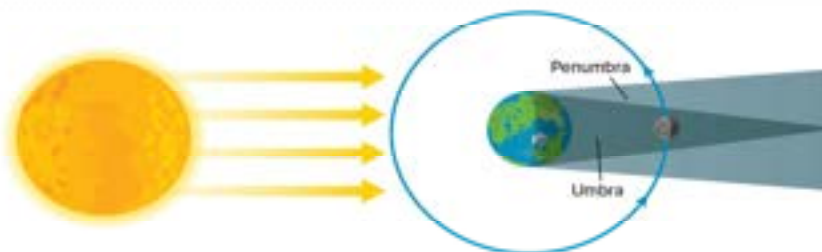
Feature	Total Solar Eclipse	Partial Solar Eclipse
Where you must be?	In the Moon's umbra	In the Moon's penumbra
How the Sun looks?	Completely covered by the Moon	Partially covered by the Moon
Sky appearance?	Dark like night ; stars may be visible	Dim , but not dark like night

Prepared by Mr. Issa Waswas

Q12) Explore eclipses of the Sun and the Moon. Develop and use models to explain how the motions of Earth and the Moon relate to the pattern of solar and lunar eclipses.

Lunar Eclipse

Full Moon Phase



- ☐ A lunar eclipse occurs when **the Moon moves into Earth's shadow**.
- ☐ Earth is in a line **between the Sun and the Moon**.

Unlike solar eclipses, **lunar eclipses** are **visible to everyone** on the **nighttime side of Earth**.



- **Total lunar eclipse** → the **entire Moon** moves into **Earth's umbra** → the Moon appears **very dark or reddish**
- **Partial lunar eclipse** → **only part of the Moon** enters **Earth's umbra** → **that part** appears **much darker**

Prepared by Mr. Issa Waswas

Q13) Develop and use models to describe the role of gravity in the formation of stars and the solar system. Develop and use models to describe how gravity affects the motions of objects in the solar system and learn how galaxies are classified.

Galaxies

- ❑ Galaxies are **huge collections of stars**. (Held together by **gravity**)
- ❑ Clusters are **groups of galaxies**. (Held together by **gravity**)
- ❑ Superclusters are **group of clusters**. (Held together by **gravity**)

In **spiral galaxies**, **gravity** causes **stars, dust, and gas to rotate in a flat disk** with spiral arms.



Elliptical galaxies often form when **two spiral galaxies collide** and merge **due to gravity**.



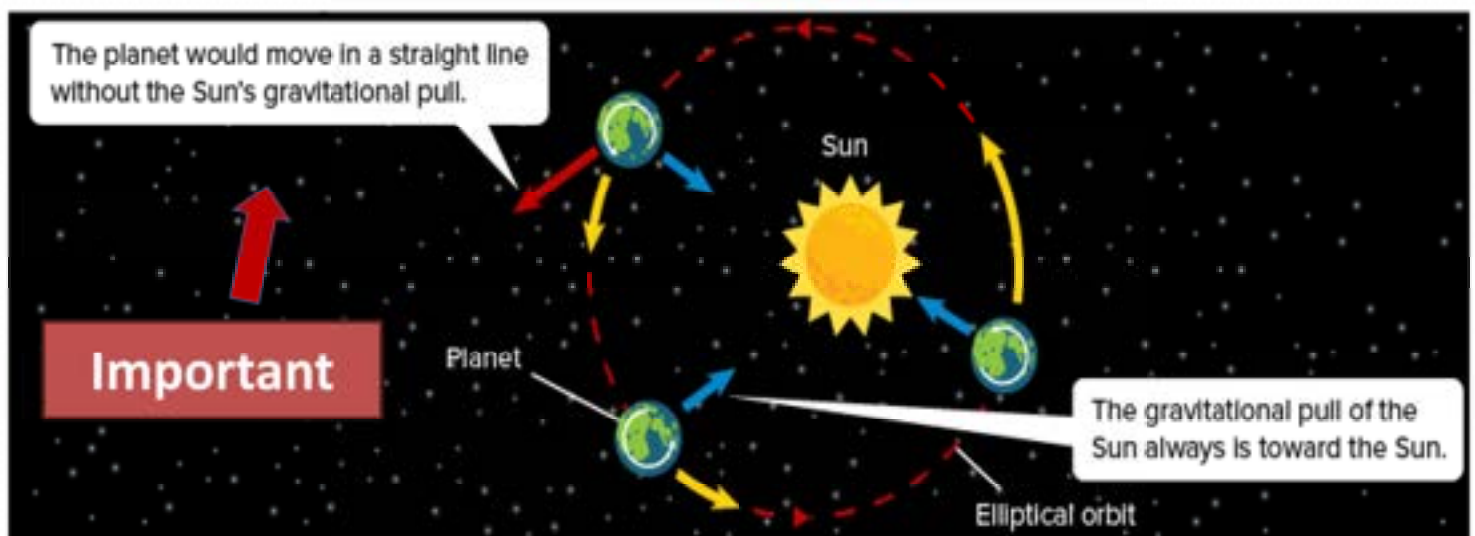
Irregular galaxies often **form from the gravitational pull** of neighboring galaxies.



Prepared by Mr. Issa Waswas

Q14) Develop and use models to describe the role of gravity in the formation of stars and the solar system. Develop and use models to describe how gravity affects the motions of objects in the solar system and learn how galaxies are classified.

- ❑ The **Sun's gravitational force pulls** each planet **toward the Sun**.
- ❑ A **planet's orbit** is an **ellipse**—a **stretched-out circle**. (Elliptical orbit)

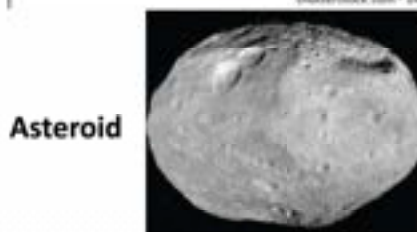


Prepared by Mr. Issa Waswas

Q15) Learn about the different types of objects in the solar system. Analyze and interpret data to explore the technology scientists use to study the solar system. Use models to determine the scale properties of objects in the solar system.

What Objects Make Up the Solar System?

- ❖ The solar system includes the **Sun**, **8 planets**, **dwarf planets**, **moons**, **asteroids**, and **comets**.
- ❖ The **inner planets** (Mercury, Venus, Earth, Mars) are **closest to the Sun** and made of **rocky material**.
- ❖ The **outer planets** (Jupiter, Saturn, Uranus, Neptune) are **farther from the Sun** and made of **ice and gases**.



Asteroid



Comet



Meteor

Prepared by Mr. Issa Waswas

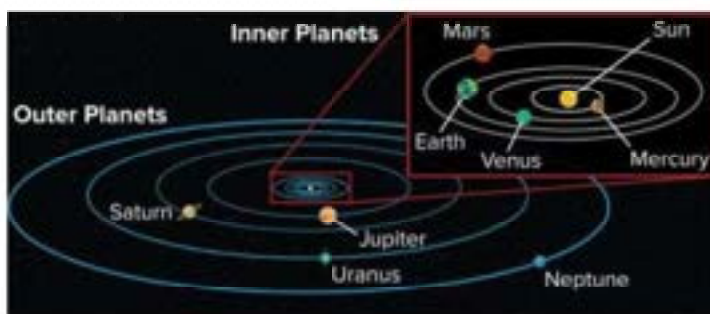
What technologies scientists use to study the solar system?

- ❖ Astronomers observe the solar system using different types of **telescopes**.
- ❖ NASA leads space exploration by sending **space missions** to planets, moons, and other objects.

How do scientists analyze data about the solar system?

- ❖ by measuring **planet distances from the Sun** and their **orbital speeds**.
- ❖ They use astronomical units (**AU**). One AU equals about 150 million km (Earth-Sun Distance)
- ❖ Planets **closer** to the Sun move **faster**, and further planets move slower.

NASA has sent **missions to Mars** for nearly 50 years, with travel times ranging from **150 to 360 days**. To prepare for human travel, this **time needs to be reduced**.



Assume the different spacecraft were using the **same amount of fuel at the same rate**. **Why are there such long differences in travel time?**



The distance from Earth to Mars changes

Prepared by Mr. Issa Waswas

الأسئلة المقالية (كتابي)

FRQs

Prepared by Mr. Issa Waswas

Q16) Explore **different ways** that information can be encoded and transmitted, while obtaining, evaluating, and communication information about the **role of science in developing and using information technologies**. Compare **digitized signals** to analog signals, constructing explanations about how noise can cause an analog signals to degrade over time, whereas a **digital signal** can be reproduced and transmitted consistently.

A **signal** is a **piece of information** that is **communicated** through using the **senses**.

The process of transmitting signals from sender to receiver:



Question: What Does It Mean to **Encode a Signal**?

Answer: convert information into a specific format using a predetermined system that both the sender and receiver understand.

Examples of Encoded Signals

- **Morse Code** (Dots and dashes)
- **Binary Numbers** (1s and 0s)
- **Smoke signals** (Used in ancient times)

Prepared by Mr. Issa Waswas

Other Examples of Encoded Signals



Hikers often leave an encoded signal made from rocks and sticks to inform other hikers of trail **dangers or directions**.

Most devices, like **computers, phones, televisions, and radios** have built-in technology that **encodes and decodes information automatically**.

How signals can be **transmitted** for a long distance?



by using **electromagnetic waves** such as **radio waves, microwaves, or light waves**.

Advantages

- 1- They travel **very fast**.
- 2- They can **travel through empty space** (vacuum).
- 3- They can be **modulated or varied** in many ways.
- 4- They **do not** permanently **move matter**.

Disadvantages

- 1- They **lose energy** as they travel through **mediums**.
(This reduces **how far** a message can be sent)

Computers, phones, televisions, and radios send or receive signals by **electromagnetic waves** or electric signals that **travel through optical fiber**.

Prepared by Mr. Issa Waswas

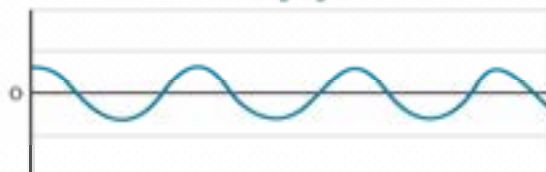
Analog signal



Changes **continuously** over time

Examples: **radio/speedometer** (analog form)

Analog Signal



Continuous smooth curve

More affected by Noise
Noise is **difficult** to filtered
Noise **degrade** the **original signal** results a **loss of quality**.

Digital signal



Changes between **two values**. (**discrete values**)

Examples: **computers** (binary numbers 0 and 1)

Digital Signal



Two values—on (1) and off (0)

Less affected by Noise
Noise is **easily** filtered.
The information can **still be clear**

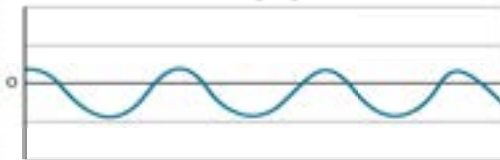
Prepared by Mr. Issa Waswas

Important



Noise is the **unwanted or unavoidable** modification of a signal.

Analog Signal



+

Noise



Recorded Signal



Continuous
range of
values

Difficult to
filtered

Degrade over
time

Binary
Numbers
0 and 1

Easy to
filtered

Clear and
Reproducible

Digital Signal



+

Noise



Recorded Signal



Prepared by Mr. Issa Waswas

You and a friend are playing with portable **two-way radios**. Your friend says this is the **best form of digital communication** he knows.

Question: Create an argument explaining **why these toys are not digital communication** devices.



Answer: Two-way radios use **analog signals**, not digital. The signal is **continuous**, like radio waves, **not made of 0s and 1s**. So, they are **not digital** devices.

Question: Create a **diagram** that shows what happens to a signal as it is **transmitted over long distances**.

Signal **Source**
(Strong)



sends
signal



signal **weakens** by noise
(over long distance)



Receiver

Prepared by Mr. Issa Waswas

Q17) learn how people use resources and how increased consumption of resources affects Earth's systems. They will use evidence to explain how activities and technology can mitigate the negative impacts on earth.

Deforestation



is the **removal** of large areas of **forests** for **human purposes**.

Effect of deforestation on Earth's Systems



System	Effect
Biosphere	- Loss of habitat for animals (Increases extinction risk)
Geosphere	- Plant roots no longer hold the soil (Soil erosion increases)
Hydrosphere	- Land dries quickly and holds little moisture (Drought)
Atmosphere	- Photosynthesis decreases (More carbon dioxide CO ₂ in the atmosphere)

Prepared by Mr. Issa Waswas

Question: Outline an argument for **how deforestation impacts Earth's systems**. What are the **short-term consequences** of clearing land? Predict the **long-term consequences** of clearing entire forests.



Short-term consequences



Positive impact : increase in **fuel and paper production**.

Negative Impact: habitat loss, drought, and soil erosion.

Long-term consequences



Negative Impact:

- **Extinction** of species and a **decrease in biodiversity**.
- increases carbon dioxide in the atmosphere due to reduced photosynthesis, which can contribute to **climate change**.

Prepared by Mr. Issa Waswas

Ecological footprints

is the area of Earth's productive **land** and **water** required **to supply the resources** that an **individual demands** as well as to **absorb the wastes** that the **individual produces**.

Actions you can do to **minimize ecological footprints** ?



- 1) Walk or ride my bike to school.
- 2) Use public transportation.
- 3) Avoid processed foods.
- 4) Recycle and purchase recycled products.
- 5) Use reusable grocery bags and water bottles.
- 6) Turn off the lights and other electronic equipment when not in use.
- 7) Take shorter showers and turn the water off when brushing teeth.

Prepared by Mr. Issa Waswas

Question: What types of **technologies and activities** help mitigate the **effects of changes in Earth's systems**?

Technology or Activity	How It Helps Mitigate Impact
Conservation drones	Help monitor natural areas and protect ecosystems
Using renewable resources	Such as solar or wind power helps reduce harmful emissions and resource usage
Fertilizer use	Improves crop yield , reducing need to clear more land



Prepared by Mr. Issa Waswas

Question: How can the **ecological footprint model** be used to predict **how changes in resource consumption might affect Earth's systems?**



Higher resource consumption (**larger** ecological footprint) → **Greater negative** effects on Earth's systems (pollution, habitat loss, and climate change)

Lower resource consumption (**smaller** ecological footprint) → **Reduced negative** effects on Earth's systems (helping protect the environment)



Prepared by Mr. Issa Waswas

Question: Summarize it Create a concept **sketch** that describes your understanding of how changes in human populations have a causal role in changing Earth's systems. **Then, write complete sentences** describing the sketch. Be creative!

It's Just A summary

Human **Population**
increases



Overuse of **natural**
resources



Negatively affect the
earth's system

- ☐ As the **human population increases**, the **demand for natural resources increases**.
- ☐ This leads to more deforestation and overuse of natural resources.
- ☐ These human activities negatively **affect Earth's systems**. The **biosphere** is impacted through **habitat loss**, the **geosphere** through **soil erosion**, the **atmosphere** through **increased greenhouse gases**, and the **hydrosphere** through **water pollution**.

Prepared by Mr. Issa Waswas

Q18) Explore **Earth's motion and the seasons**. Develop and use models to explain how earth's **rotation, revolution, and tilted axis** cause the patterns of the **seasons, day and night**, and the **apparent motions** of the sun, Moon, and stars in the sky. Explore the **phases of the Moon**. use models to explain how the Moon's revolution relates to the pattern of lunar phases.

Rotation	Revolution
	
The spinning motion of Earth on its axis.	The motion of Earth around the Sun in an orbit.
Earth rotates on an imaginary line that runs through its center called rotation axis .	The path an object follows as it moves around another object is an orbit .
One complete rotation takes about 24 hours .	One complete revolution takes 365.24 days .
Direction: From west to east	Direction: counterclockwise .
Causes: day and night	Causes: seasons (summer, winter, spring, fall).
Evidence: Sun, Moon, and stars appear to move from east to west .	Evidence: Seasonal patterns and changes in daylight duration and sunlight.

Prepared by Mr. Issa Waswas

The Sun's Apparent motion

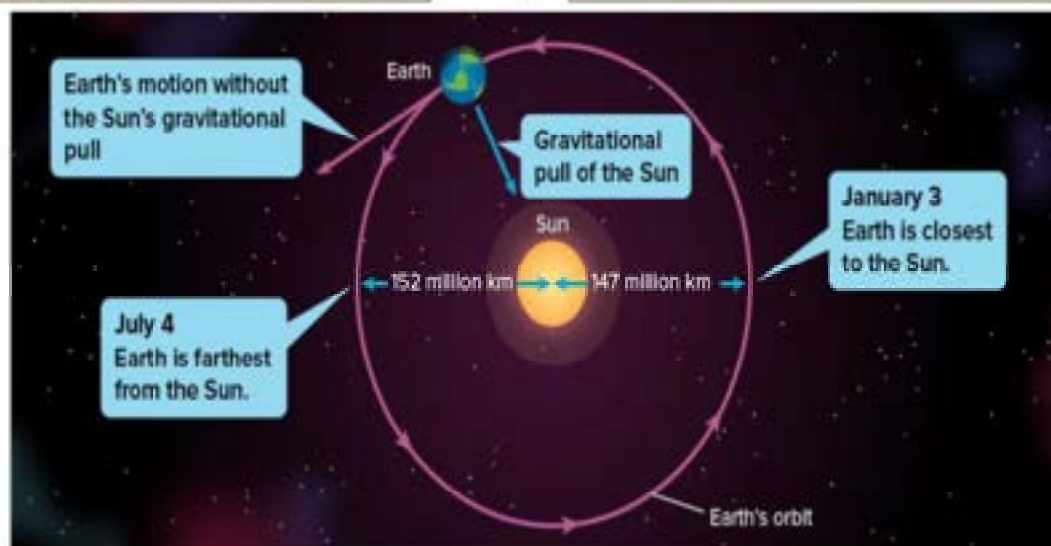


The Sun, Moon, and stars **appear** to move **from east to west** across the sky. In fact, this is due to Earth's rotation from west to east.

Question: **Why does Earth orbit the Sun?**



Answer: because of the **Sun's gravitational pull**.



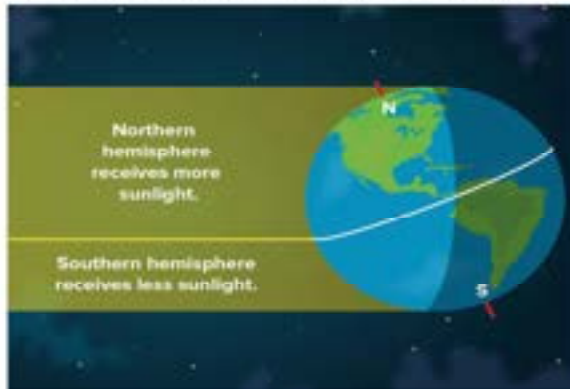
Prepared by Mr. Issa Waswas

Question: How does the **varying amount of the Sun's energy cause the seasons?** What **effects does the tilt of Earth's axis** have on the seasons?

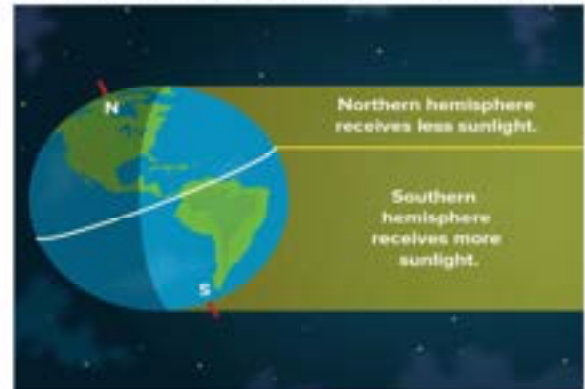


Answer: **Earth's tilted axis** causes the seasons by **changing how much sunlight** each hemisphere gets as **Earth move around the Sun**.

Northern hemisphere **tilts toward the Sun**, it gets **More sunlight** (Summer), while the southern hemisphere gets less (summer).



Northern hemisphere **tilts away from the Sun**, it gets **less sunlight** (winter), while the southern hemisphere gets more (summer).



Prepared by Mr. Issa Waswas

Earth's Seasonal cycle

Solstice



is a day when **Earth's rotation axis** is the most **toward or away** from the Sun.

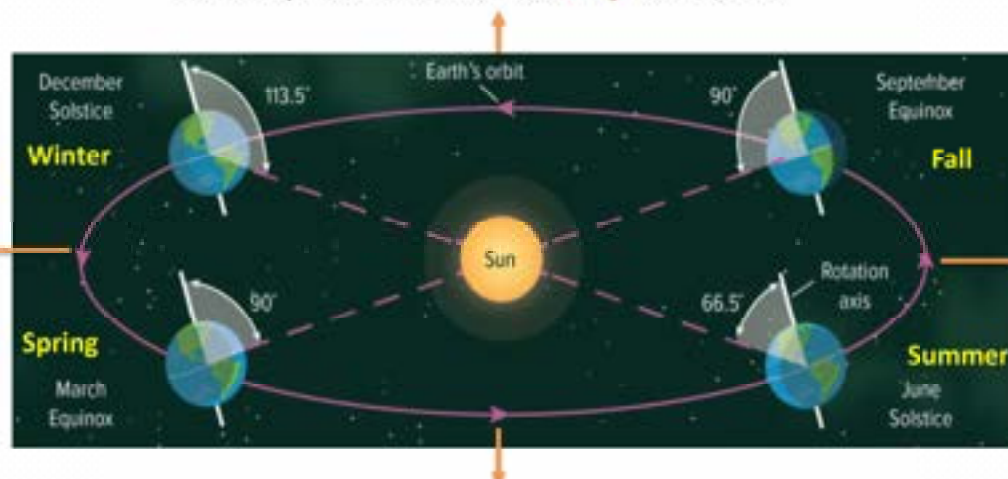
Equinox



is a day when **Earth's rotation axis** is **neither toward nor away** from the Sun

The north points **more and more away** from the Sun.

The north still points **away** from the Sun but does so **less and less**



The north still points **toward** the Sun but does so **less and less**.

The north slowly points **more and more toward** the Sun

Prepared by Mr. Issa Waswas

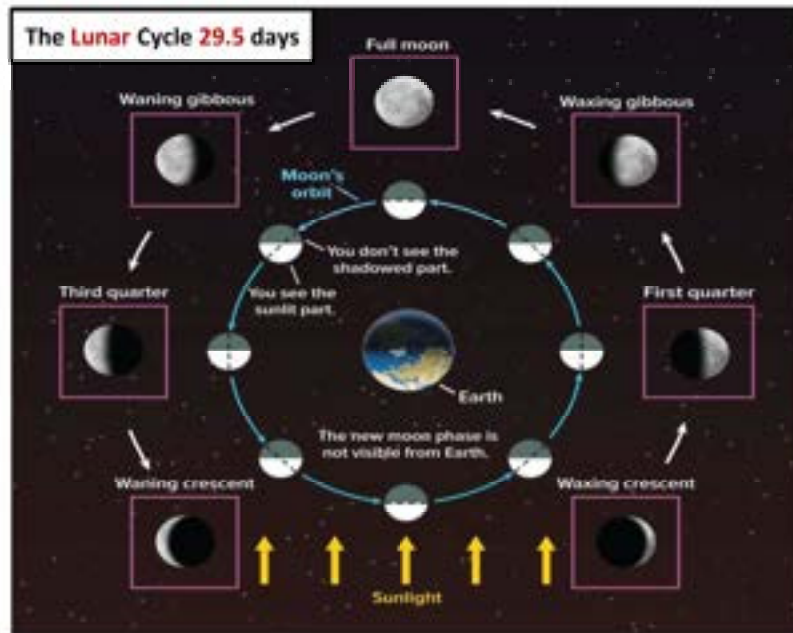
Question: How does the **Moon's revolution** contribute to **lunar phases**?



Answer: As the Moon revolves around Earth, **the visible lit part changes**, causing the lunar phases.

Waning

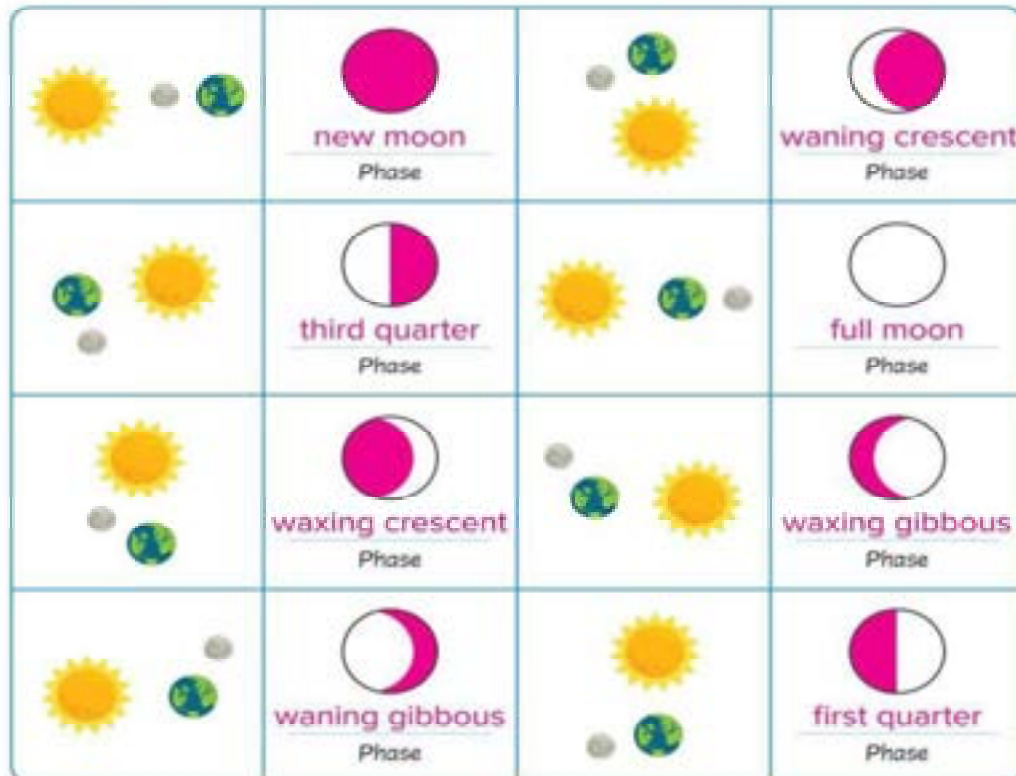
- The **second half** of the lunar cycle.
- **Less** of the Moon's near side is **lit** each night.



Waxing

- The **first half** of the lunar cycle.
- **More** of the Moon's near side is **lit** each night.

Prepared by Mr. Issa Waswas



Prepared by Mr. Issa Waswas

Week 1—First Quarter
The entire **western** half is **lit**.

First quarter



At midnight, the first quarter moon is setting. It rises during the day at about noon.



Week 2—Full Moon
Moon's near side is **completely lit**

Full moon



The full moon is highest in the sky at about midnight. It rises at sunset and sets at sunrise.



Week 3—Third Quarter
The entire **eastern** half is **lit**.

Third quarter



The third quarter moon rises at about midnight, about six hours later than the full moon rises.



Week 4—New Moon
Moon's near side is **completely dark**.



New Moon

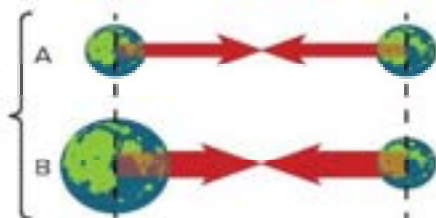
Prepared by Mr. Issa Waswas

Q19) Develop and use models to describe the role of gravity in the formation of stars and the solar system. Develop and use models to describe how gravity affects the motions of objects in the solar system and learn how galaxies are classified.

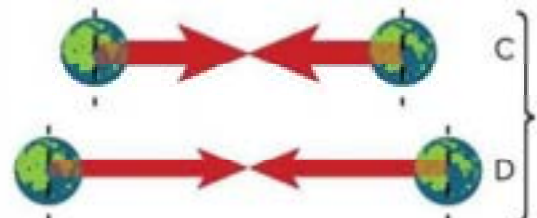
Gravity is the **force** that **every object exerts** on **all other objects** because of their **masses**.

The gravitational force depends on:

- 1- **Mass** (**larger** objects have **stronger** gravitational forces **than** do **smaller** objects).
- 2- **Distance** (objects that are **closer together** have **stronger** gravitational forces between them **than** do objects that are **farther away** from each other).



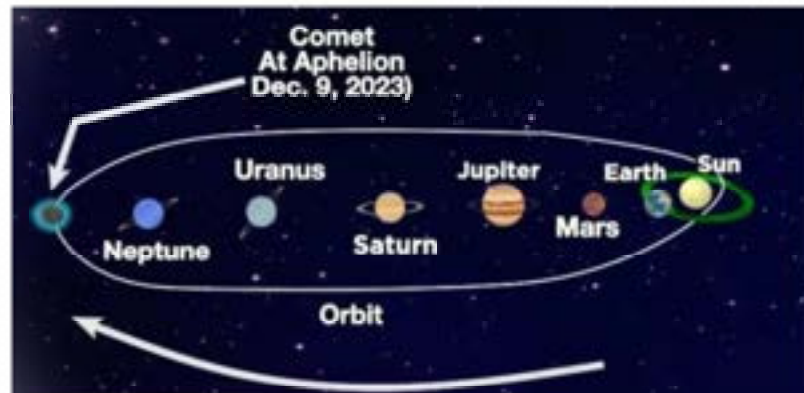
Same distance
objects in row **B** has **more mass**
(**stronger gravitational force**)



Same mass
objects in row **C** are **closer** to each other
(**stronger gravitational force**)

Prepared by Mr. Issa Waswas

Question: Newton's laws state that all objects exert gravitational force and that objects with more mass exert more force. Which system of objects has the greatest effect on the orbit of Halley's Comet?



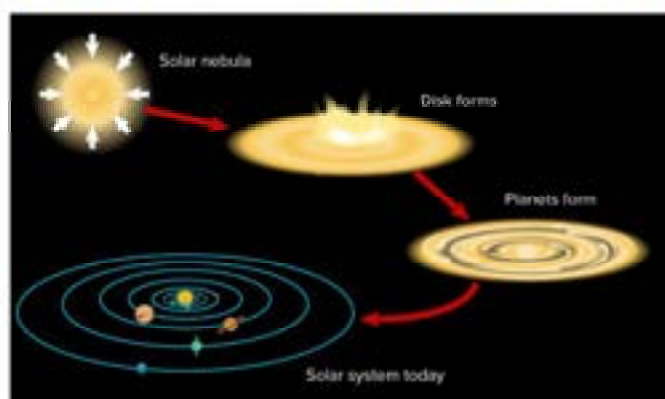
Answer: The Sun, Jupiter, and Saturn

- ✓ Because they are the **most massive** objects listed, they exert the **strongest gravitational pull**, which greatly affects the comet's orbit.

Prepared by Mr. Issa Waswas

Solar System Formation

- 1- It started with a **Nebula** (a **cloud of gas and dust**) floated in space.
- 2- **Gravity** caused the denser particles in the nebula to contract toward the center. (**Protostar**)
- 3- The center got hot and dense, eventually forming the **Sun** through **nuclear fusion**.
- 4- The **leftover material** around the Sun clumped together to form **protoplanets**, which later became **planets**.
- 5- **Moons, dwarf planets, and asteroids** also formed from **leftover materials**.
- 6- All planets now **orbit the Sun** because of its **strong gravitational force**. (**Solar System**)



Prepared by Mr. Issa Waswas

Question: Using what you know about how the solar system formed, construct an explanation of **how other solar systems in other galaxies might form.**



Answer: Since **gravity** is the main force responsible for forming solar systems, it is likely that **other solar systems in other galaxies formed in the same way.**

Nebula → Gravity pulls material in → Protostar forms → Sun forms

Leftover material → Protoplanets → Planets, moons, asteroids → Complete Solar System



Prepared by Mr. Issa Waswas

How are galaxies classified ?

Spiral Galaxy

- ☐ The stars, gas, and dust exist in the **spiral arm**.
- ☐ Spiral arms can be long and symmetrical or short and stubby.
- ☐ Thicker at the center (Bulge).
- ☐ **Older redder stars surround the disk** (Halo).



Elliptical Galaxy

- ☐ Do not have spiral arms.
- ☐ Have the **highest percentage of old, red stars**.
- ☐ Have **little or no gas**.
- ☐ Form by gravitational **merging** of two or more **spiral galaxies**.



Irregular Galaxy

- ☐ Have **odd shape**.
- ☐ Have the **highest percentage of young stars**.
- ☐ Area of star formation.
- ☐ Form by gravitational merging of **neighboring galaxies**.



Prepared by Mr. Issa Waswas



@ISSAWASWAS

تمنياتى لكم بالتوفيق والنجاح بإذن الله