

ملخص دروس Module: Exploring the universe منهج انسابير



تم تحميل هذا الملف من موقع المناهج الإماراتية

موقع المناهج ← المناهج الإماراتية ← الصف الثالث ← علوم ← الفصل الثالث ← ملفات متنوعة ← الملف

تاريخ إضافة الملف على موقع المناهج: 2025-05-12 10:21:13

ملفات اكتب للمعلم اكتب للطالب | الاختبارات الكترونية | اختبارات | حلول | عروض بوربوينت | أوراق عمل
منهج انجليزي | ملخصات وتقارير | مذكرات وبنوك | الامتحان النهائي للمدرس

المزيد من مادة
علوم:

إعداد: Emam-El Aya

التواصل الاجتماعي بحسب الصف الثالث



صفحة المناهج
الإماراتية على
فيسبوك

الرياضيات

اللغة الانجليزية

اللغة العربية

التربية الاسلامية

المواد على تلغرام

المزيد من الملفات بحسب الصف الثالث والمادة علوم في الفصل الثالث

الدليل الذهبي في مراجعة جميع دروس الفصل

1

تجميعة تدريبات وامتحانات سابقة منهج انسابير

2

حل أوراق عمل امتحانية وفق منهج انسابير

3

أوراق عمل امتحانية وفق منهج انسابير

4

أسئلة الاختبار التكويني الأول في دروس تغيرات الحالة والتغيرات الفيزيائية والتغيرات الكيميائية

5



Module: Exploring the universe

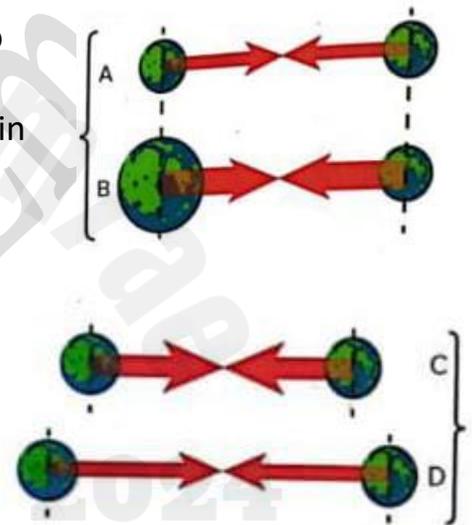
Lesson1: Gravity and the universe

What is gravity?

What Goes Up Must Come Down

In models of gravitational force, strength is represented by the thickness of the arrows (The thicker the arrows the greater the force).

The two objects in row A are the same distance apart as the two objects in row B. One of the objects in row B has more mass, creating a stronger gravitational force between the two objects in row B.



All four objects have the same mass. The two objects in row C are closer to each other than the two objects in row D and, therefore, have a stronger gravitational force between them. The Force of Gravity Objects fall to the ground because Earth exerts an attractive force on them.

The Force of Gravity

Objects fall to the ground because Earth exerts an attractive force on them.

Gravity is an attractive force that exists between all objects that have mass.

- 1- The force of gravity between, two objects depends on the objects' masses.
- 2- The distance between them.

The more mass either object has, or the closer together they are, the stronger the gravitational force.

- Earth's gravity holds us on Earth's surface.
- Since Earth has more mass than any object near you, it exerts a greater gravitational force on you than other objects do.





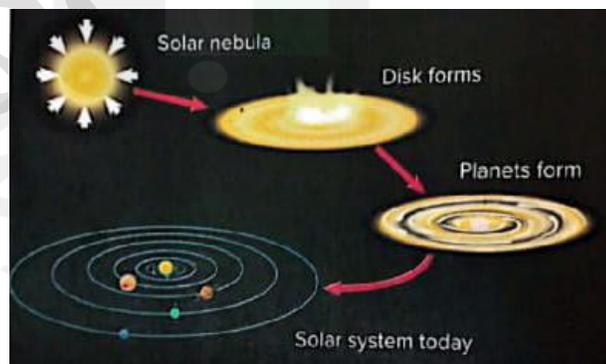
What is gravity's role in the formation of stars?

- 1- When gas and dust clump together and form nebulae, the particles bump into each other and move faster.
- 2- Gravity makes these nebulae hotter.
- 3- The hotter something is, the more quickly its atoms move.
- 4- As atoms move, they collide.
- 5- If a gas is hot enough and its atoms move quickly enough, the nuclei of some of the atoms combine.
- 6- Nuclear fusion is a process that occurs when the nuclei of several atoms combine into one larger nucleus.
- 7- Once nuclear fusion has occurred, a star is formed.

What is the role of gravity in the formation of the solar system?

Solar System Formation and Structure

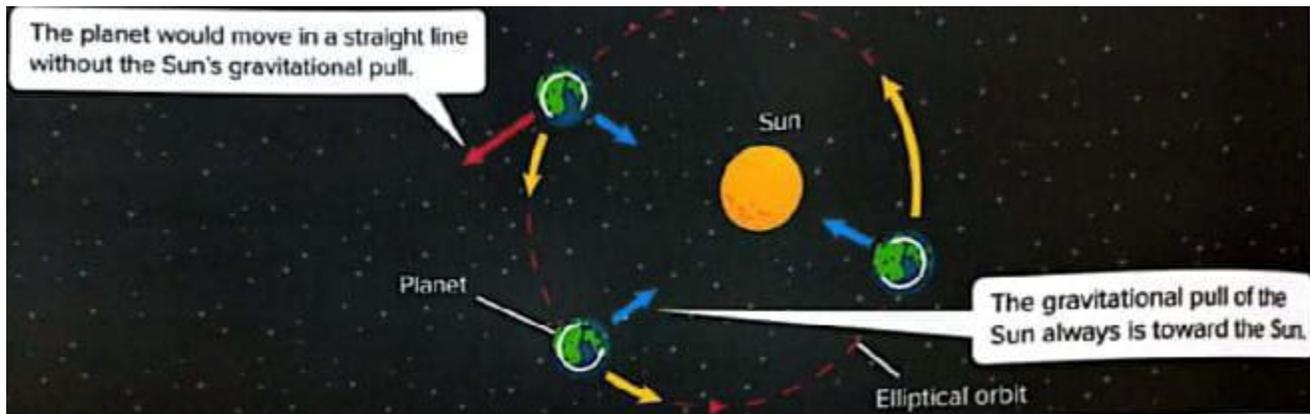
- 1- The solar system formed from a rotating cloud of gas, ice, and dust called a **nebula**.
- 2- Gravity caused the cloud to collapse inward.
- 3- Because the cloud was still rotating after the collapse, it flattened into a disk.
- 4- Gravity pulled gas and dust toward the center of the disk, **forming the Sun**.
- 5- Next, the planets began to form as gravity pulled these small particles together.
- 6- As they collided, they stuck to each other and formed larger, unevenly shaped objects.
- 7- These larger objects had more mass and attracted more particles.
- 8- Eventually enough matter collected and formed **Earth and the seven other planets**.
- 9- The leftover larger particles formed into **moons** that orbit the planets.
- 10- Asteroids orbit the Sun in the asteroid belt, while meteoroids, dwarf planets, and comets orbit the Sun in their own paths through the solar system.





How does gravity affect objects that orbit the Sun?

planets move in an elliptical shape.



Planetary Orbits

Earth was once thought to be the center of our solar system. In this **geocentric model**.

geocentric model	heliocentric model
the Sun, the Moon, and the planets revolved in circular orbits around a stationary Earth	In the early 1500s, Nicholas Copernicus proposed that Earth and other planets revolve in circular orbits around a stationary Sun, a heliocentric model.

HISTORY Connection In the 1600s, Johannes Kepler discovered that planets' orbits are **ellipses, not circles.**

- An ellipse contains two fixed points, called **foci** (singular, focus).
- Foci are equal distance from the ellipse's center and determine its shape.
- The Sun is at one focus.
- As a planet revolves, the distance between the planet and the Sun changes.
- Kepler also discovered that a planet's speed increases as it gets nearer to the Sun.

Remember the gravitational force between objects depends on mass and distance. So, the Moon orbits Earth because the gravitational attraction between the Moon and Earth is stronger than the attraction between the Moon and the Sun.



What are galaxies?

Galaxies are huge collections of gas, dust, and stars held together by gravity.

The universe contains hundreds of billions of galaxies, and each galaxy can contain hundreds of billions of stars —→ And many of those stars have planets and other celestial objects orbiting them.

❖ *Groups of Galaxies*

Galaxies are not distributed evenly in the universe.

Gravity holds them together in groups called **clusters**.

Some clusters of galaxies are enormous.

The Virgo Cluster contains about 2,000 galaxies.

Most clusters exist in even larger structures called **superclusters**.



Virgo Cluster

❖ *The Milky Way*

One of those galaxies is our galaxy—**the Milky Way**.

Our solar system and many other solar systems are in the Milky Way.

a galaxy that contains almost 200 billion stars —→ These stars and solar systems orbit around the center of the Milky Way.

The Milky Way is a member of the Local Group, a cluster of about 30 galaxies.

How are galaxies classified?

Types of Galaxies



Spiral Galaxies

- The stars, gas, and dust in a spiral galaxy exist in the spiral arms that begin at the central disk.
- Some spiral arms are long and symmetric; others are short and stubby.
- Spiral galaxies are thicker near the center, a region called the **central bulge**.



Elliptical Galaxies

- Unlike spiral galaxies, elliptical galaxies do not have spiral arms.
- Elliptical galaxies have a higher percentage of old, red stars.
- They contain little or no gas.
- Scientists suspect that many elliptical galaxies form by the gravitational merging of two or more spiral galaxies.



Irregular Galaxies

- Irregular galaxies are oddly shaped.
- Many formed from the gravitational pull of neighboring galaxies. Irregular galaxies contain young stars and have areas of intense star formation.

It was once thought that Earth was the center of the universe. Eventually, it was proven that the planets orbit around the Sun. The illustration shows the path of Earth's orbit around the Sun.



✚ Describe the path of Earth if the Sun's gravity were to suddenly stop

- A) Earth would continue to move within its orbit.
- B) Earth would move in a straight line towards the Sun.
- C) Earth would move in a straight line instead of a curved line.
- D) Earth would stop moving and become suspended in one spot.



Halley's Comet orbits the Sun and can be seen from Earth about every 76 years. However, before the work of Sir Isaac Newton and Edmond Halley, comets were thought to pass in a straight line through the solar system. In 1705, Edmond Halley used Newton's laws to determine the gravitational effects of Jupiter and Saturn on a comet that he observed in 1682. Using this information and historical records, he determined that comets seen in 1531 and 1607 were the same comet. Halley correctly calculated the orbit of the comet and predicted its return in 1758.

- ✚ 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?**
- A) Earth, the Sun, and the Moon.
 - B) the Sun, Jupiter, and Saturn.
 - C) asteroids, meteoroids, and dwarf planets.
 - D) Earth, the Sun, and Saturn.



Lesson2: The Solar System

What objects make up the solar system?

Recall that gas, dust, and stars make up galaxies.
Stars are made up of gas that is undergoing fusion at the core.

What's in a solar system?

A solar system contains at least one star and all the objects that orbit around that star—→This includes planets, moons, comets, asteroids, and meteoroids.

How do astronomers observe the solar system?

Telescopes enable astronomers to observe many more stars than they could with their eyes alone.

Telescopes are designed to collect a certain type of electromagnetic wave Some telescopes detect visible light, and others detect radio waves and microwaves.



Technology Advances

In addition to telescopes, space agencies like NASA have sent probes and other exploratory spacecraft into space.

For example, the (New Horizons mission) explored the Pluto system within our solar system and will explore objects on the edge of the solar system in the Kuiper belt.

The space program requires the development of materials that can withstand the extreme temperatures and pressures of space.



How can you model the solar system?

A scale model is a physical representation of something that is much smaller or much larger. Reduced-sized scale models are used to represent and study very large things, such as the solar system.

Different types of objects orbit the Sun.

These objects include (dwarf planets, asteroids, meteors, and comets).

Unlike the Sun, these objects don't emit light but only reflect the Sun's light.

Moons of the Outer Planets

Jupiter has 79 confirmed moons. Saturn has 53 named moons and 8 provisional moons. Uranus has 27 moons while. Neptune only has 13 named moons with one provisional moon. outer planets have so many moons compared to the inner planets.

- The moons of the outer planets range in diameter from 2 km to 5,268 km.
- The largest moon in the solar system is **Jupiter's Ganymede**, which is larger than the planet Mercury.

Moons of the Outer Planets			
Planet	Number of Moon	Largest Moons	Moon Sizes
Jupiter	79 confirmed	Ganymede, Callisto, Io, Europa	These four moons are planet-sized. Ganymede is the solar system's largest moon, with a diameter of 5,268 km.
Saturn	at least 53	Titan, Rhea, Iapetus, Dione	Titan is planet-sized at 5,150 km in diameter.
Uranus	at least 27	Titania, Oberon, Umbriel, Ariel.	Titania is 1,578 km in diameter, while tiny Cordelia is 26 km in diameter.
Neptune	at least 13	Triton, Proteus, Nereid, Larissa.	Triton is 2,700 km in diameter.



Moons

Many moons of the outer planets are small with Irregular shapes and unusual orbits → Some scientists think that these are captured asteroids (meaning the gravity of the planet pulled the object into its orbit).

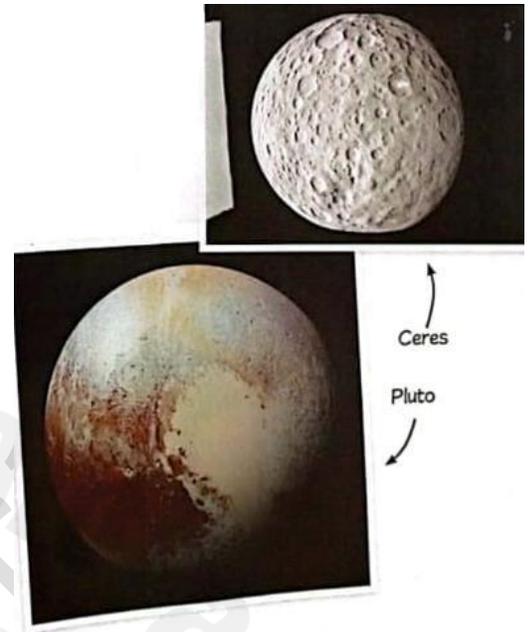
Dwarf Planets

A dwarf planet is a spherical object that orbits the Sun.

It is not a moon of another planet and is in a region of the solar system where there are many objects orbiting near it. But, unlike a planet, a dwarf planet does not have more mass than objects in nearby orbits.

Dwarf planets include:

- 1- Ceres.
- 2- Eris.
- 3- Pluto.
- 4- Makemake.



Dwarf planets are made of rock and ice and are much smaller than Earth.

Other Solar System Objects

Asteroids

Asteroids are chunks of rock and ice that never clumped together like the rocks and ice that formed the inner planets.

- asteroids are objects left over from the formation of the solar system.
- Most asteroids are found in the asteroid belt between Mars and Jupiter.



Comets

Comets are mixtures of rock, ice, and dust.

- The particles in a comet are loosely held together by the gravitational attractions among the particles.
- Comets orbit the Sun in long elliptical orbits.





Meteoroids, Meteors, Meteorites.

Meteoroids are small, rocky particles that move through space.

- Most meteoroids are only about as big as a grain of sand.
- When meteoroids pass through Earth's atmosphere, they burn up because of friction and are seen as streaks of light in the sky → This is called a **meteor**. If a meteor doesn't completely burn up, it can impact the planet's surface → At that point, it is called a **meteorite**.

