

Unit 1 Lesson 1

Measuring Tools

Measuring Tools (أدوات القياس)

- **Object** is a something around you that you can see, touch and use.

الأداة : هي كل شئ يوجد حولنا نستطيع أن نراه ونلمسه ونستخدمه

For example: Pen is an object is used to write. القلم هو أداة نستطيع أن نراه ونلمسه ونستخدمه للكتابة.

Laptop is an object to get information. اللاب توب هو أداة نستخدامها للحصول علي المعلومات.

- **Measuring Tools**: tools used to measure the objects (big, small, long, short ...)

أدوات القياس: هي أدوات نستخدمها لوصف وقياس الـ Object (كبير - صغير - طويل - قصير -)

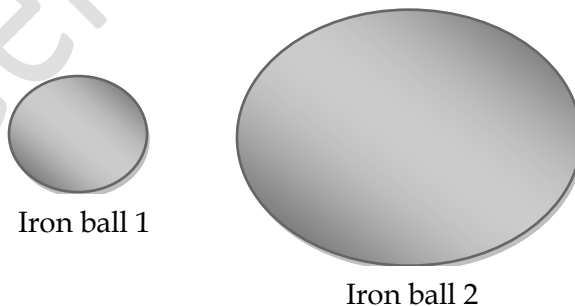
يمكن التفريق بين مادة وأخرى عن طريق الكتلة والحجم.

- **Matter**: is anything that has a mass and volume المادة : أي شئ له كتلة وحجم

- **Mass**: is the amount of matter that the object contain الكتلة : هي كمية المادة التي يحتويها الجسم

- **Volume**: is the space that is occupied by the object (matter) الحجم : الحيز الذي يشغله الجسم

مثال للتوضيح والفهم لمفهوم الكتلة والحجم -- إذا افترضنا ان الكورتين في الشكل التالي مصنوعين من الحديد



Note That:

Mass of ball 2 is bigger than mass of ball 1 **why??** Because ball 2 has matter more than ball 1

كتلة الكرة رقم 2 أكبر من كتلة الكرة رقم 1 لماذا؟؟ لأن الكرة رقم 2 تحتوي علي كمية من الحديد أكبر من الكرة رقم 1

Volume of ball 2 is bigger than volume of ball 1 **why??** Because ball 2 occupy space more than ball 1

حجم الكرة رقم 2 أكبر من حجم الكرة رقم 1 لماذا؟؟ لأن الكرة رقم 2 تشغل حيز من الفراغ أكبر من الكرة رقم 1

- Give Reason : مالسبب او لماذا

- a) Paper is matter? Because paper has mass and volume
- b) Water is a matter? Because water has mass and volume
- c) Air is a matter? Because air has mass and volume

- To deal with some matter, we must measure their **length**, **mass** and **volume**.

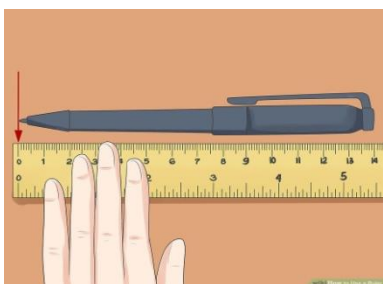
1) Length

Length

The Measuring Tools

1- Ruler : for small lengths

Like the length of a book.



2- Graduated tape : for large lengths

Like the length of a classroom



The Measuring units

1- Centi meter (cm)

For measuring small lengths

as pen or book

2- Meter (m)

For measuring large lengths

as dimensions of your classroom

1 meter (m) = 100 centimeter

3- Kilometer (km)

For measuring very large lengths

as the distance between Cairo

and Alexandria (1 Km = 1000 m)

2) Mass

Mass

The Measuring Tools

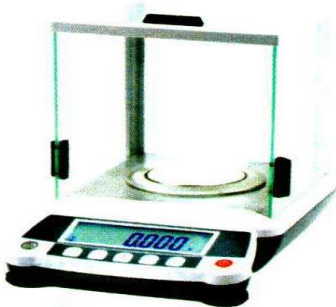
1- common balance (two-pan balance)

For **large masses** like tomato and cheese



2- Sensitive balance

For **very small masses** like gold
and chemicals



The Measuring units

1- Gram (g)

Measure **small masses** such as jewelry

2- Kilogram (kg)

Measure **large masses** such as fruits
and vegetables

1 kilogram (m) = 1000 grams

3- Ton

Measure **heavy masses** like cars

1 Ton = 1000 kilograms

3) Volume

Volume

The Measuring Tools

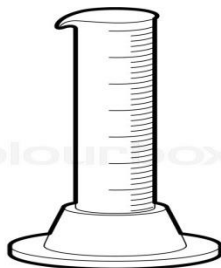
1- A Ruler that measures the

dimensions of a regular solid body

$$V = \text{length} \times \text{width} \times \text{height}$$

(Ex.) Measuring the volume of a book

2- A Graduated Cylinder



graduated cylinder

It measures the volume of liquids

Ex. (water, oil, milk,) or

an irregular solid body.

The Measuring units

1- Liter or milliliter

Measuring volumes of liquids only

2- The cubic meter (m^3) or cubic centimeter (cm^3)

For measuring volumes of solids and liquids.

$$1 \text{ liter} = 1000 \text{ milliliter}$$

ملحوظة هامة جدا : في الأسئلة التي تحتوي علي كلمة unit تكون الإجابة بـ cm , kg, km, m,

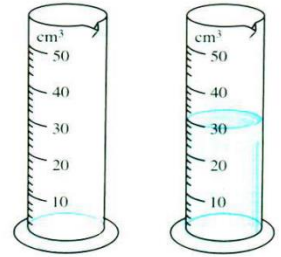
أما الاسئلة التي تحتوي علي كلمة tool تكون الإجابة بـ ruler, measuring tape, graduated cylinder,

Ways (methods) to measure the volumes:

A) Estimating the volume of liquid (or water):

- Pour an amount of water into a graduated cylinder.
- Record the reading at lower level of water surface.

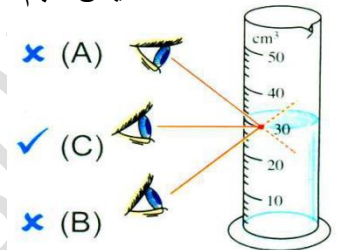
The volume of liquid is 30 cm^3



لقياس حجم كمي من الماء نضعها في الـ measuring cylinder وروية القراءة تكون في إتجاه أفقي عند النقطة C

Note that: your eyes must be in horizontal position

The correct position is (C)

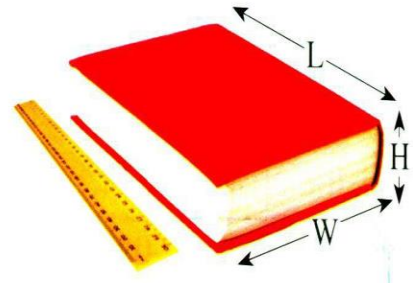


B) Estimating the volume of solid body (regular or irregular):

1) Regular solid body (As box or book)

- Measure the length, width and height of the book by a ruler
- We can calculate the volume by :

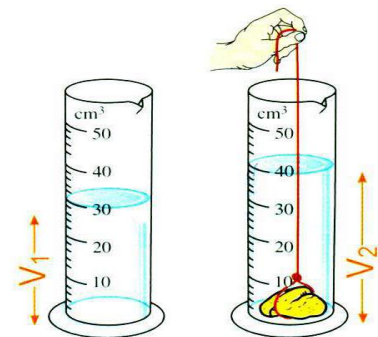
$$\text{Volume} = \text{length} \times \text{width} \times \text{height}$$



لقياس حجم جسم منتظم (مثل الكتاب) نقيس الطول والعرض والارتفاع ثم نحسب الحجم عن طريق الحجم = الطول \times العرض \times الارتفاع

2) Irregular solid body (As stone or marble)

- Pour amount of water in graduated cylinder and record the volume of water (V_1).
- Put a piece of stone carefully in the cylinder and record new volume of water + stone (V_2)
- The volume of stone = $V_2 - V_1 = \dots\dots\dots \text{Cm}^3$



لقياس حجم قطعه من الـ stone نضع كمي من الماء في الـ measuring cylinder ونقيس الحجم بالطريقة

العادية وليكن V_1 ثم نضع قطعة الـ stone في الماء فترتفع الماء لأعلي ونقيس الحجم ونسميه V_2

$$\text{The Volume of stone} = V_2 - V_1 = 40 - 30 = 10 \text{ Cm}^3$$



When a body is submerged in a cylinder full of liquid completely,
an amount of the liquid is spilled out from the cylinder



So, The volume of the body = the volume of the spilled water

ملحوظة : عندما يكون الـ measuring cylinder مملوء بالماء ونضع فيه الـ stone فإن حجم الماء المنسكب هو حجم الـ stone

The relation between the volume and the mass of matter:

عندما نضع علي الميزان مكعبين أحدهما من الخشب والآخر من الحديد لهم نفس الحجم

نجد أن وزن الحديد أثقل من الخشب

Mass of iron cube > Mass of wood cube



Equal volumes of different substances have **different** masses

Remember

Length	<ul style="list-style-type: none"> Measuring ruler Graduated tape 	<p>Centimeter (cm): measuring short lengths</p> <p>Meter (m): measuring long lengths</p> <p>Kilometer (km): measuring very long lengths</p>
Mass	<ul style="list-style-type: none"> Sensitive balance Common balance (two-pan balance) 	<p>Gram (g): measuring small masses</p> <p>Kilogram (kg): measuring large masses</p> <p>Ton : measuring very large masses</p>
Volume	<ul style="list-style-type: none"> Graduated cylinder Measuring ruler Graduated tape 	<p>Liter (L) or milliliter (ml): Measuring the volume of liquids</p> <p>Cubic meter (m³) or cubic centimeter (cm³): Measuring the volumes of solids and liquids</p>

Vocabulary

object	جسم
Measuring tools	أدوات قياس
Matter	ماده
Mass	كتله
Volume	حجم
Occupy a space	يشغل حيز
Amount	كميه
units	وحدات قياس
Length	طول
Graduated cylinder	مخبار مدرج
Dimensions	الأبعاد
Ruler	مسطره
Two-pan balance	ميزان ذو كفتين
Sensitive balance	ميزان حساس
Jewelry	مجوهرات
Vegetables	خضروات
Heavy	ضخم

Regular solid body	جسم صلب منتظم
Irregular solid body	جسم صلب غير منتظم
Width	عرض
Height	ارتفاع
Estimate	يحسب
Methods	طرق
Pour	يسكب
Horizontal position	وضع أفقي
Record	يسجل
Stone	قطعة صخر
Marble	بليه
Submerged	يغمر
Spilled out	ينسكب
Relation	علاقه
Equal	متساوي
substances	مواد
distance	المسافة

Revision on Unit 1 Lesson 1 Measuring Tools

1) Complete the following:

1. Matter is anything that has and
2. Air is matter because it has and
3. Mass is the of matter inside an object.
4. Measuring ruler is used to measure.....
5. The length can be measured by units as and
6. The length (dimensions) of a classroom is measured in
7. The length (dimensions) of a classroom is measured by.....
8. Meter is the measuring unit of, while gram is the measuring unit of
9. Kilogram is the measuring unit of, while the meter is the measuring unit of
10. Common balance is used for measuring, while graduated cylinder is used for measuring of.....
11. is the tool that is used to measure the big masses, while the tool that is used to measure the small length is
12. One kilogram = grams
13. Small masses are measured by using, while the volume of irregular shaped objects is estimated by using.....
14. is the measuring tool of volume of liquids and irregular solids.
15. Is used to measure volume of liquids.

2) Correct the underlined words:

1. The graduated tape is used to measure the mass of fruits. (.....)
2. The graduated ruler used to measure the mass. (.....)
3. The graduated tape is used to measure the mass. (.....)
4. 6 meters = 800 centimeters. (.....)
5. Small masses are measured by graduated tape. (.....)
6. 4 kg = 100 gm (.....)
7. Liter is the measuring unit which is used for measuring the volume of solids. (.....)
8. The volume of liquids is measured by using the graduated tape. (.....)
9. Equal volumes of different materials have equal masses. (.....)
10. We can determine the volume of a stone by using graduated ruler. (.....)

3) Put (✓) or (X) correct the wrong ones: :

1. The sensitive balance is used to measure the mass of jewels. ()
2. Common balance is used to measure the mass of some fruits. ()
3. Fruit and vegetables are measured by sensitive balance. ()
4. Gram is the measuring unit of the volume of small objects. ()
5. Meter is the unit of measuring small lengths. ()
6. Mass is measured by graduated cylinder. ()
7. Graduated cylinder is used to measure the volume of liquids. ()
8. The measuring tape is used to measure the large lengths like the table. ()
9. Volume of regular solid = length + width + height ()
10. One kilogram = 100 grams. ()

4) Write the scientific term for the following:

1. Anything that has a mass and a volume. ()
2. Everything occupies a space and has a mass. ()
3. The amount of matter which the object contains. ()
4. The amount of matter in an object. ()
5. The space occupied by the matter. ()
6. A tool used to measure very small masses. ()
7. A unit which is used for measuring length. ()
8. A tool used to measure large masses such as fruits and vegetables. ()
9. A tool used to measure small masses. ()
10. The tool used to measure the volume of liquids. ()
11. A unit used to measure the small masses. ()

5) Choose the correct answer:

1. The measuring unit of small length is
a) Kg b) mm c) Cm d) Liter
2. A ruler is used to measure
a) Mass b) length c) volume
3. is a measuring unit for small masses.
a) Kilogram b) sensitive balance c) Gram
4. Gram and Kilogram are units of measuring
a) mass b) length c) volume
5. The suitable unit in estimating the mass of gold is.....
a) Meter b) centimeter c) gram d) kilogram

6. We use To measure very small masses.
a) ruler b) common balance c) sensitive balance
7. The space occupied by an object is called.....
a) length b) width c) mass d) volume
8. We use to measure the length.
a) measuring cylinder b) measuring tape c) common balance d) sensitive balance
9. One ton equals.....
a) 100 grams b) 1000 kg c) 100 kg d) 1000 g
10. The volume of cuboids =
a) length-width b) length + width + height c) length x width x height
11. The volume of a solid material is measured by
a) Cm b) Cm² c) Cm³
12. When a piece of stone is put in a jar containing 40 cm³ of water, the water level raised to 70 cm³ so that the volume of the piece of the stone equals
a) 20 Cm³ b) 30 Cm³ c) 70 Cm³ d) 110 Cm³
13. The measuring unit of volumes of solid objects is
a) m b) Cm³ c) m
14. The volume of an irregular solid object is measured by
a) ruler b) common balance c) graduated cylinder
15. We can measure the volume of irregular solid bodies by using.....
a) sensitive balance b) graduated tape c) gradated cylinder
16. Measuring cylinder is used for measuringof solid object.

6) What is the use (importance) of?

1. Graduated tape:
2. Common balance:

3. Sensitive balance:
4. Graduated cylinder. (or measuring cylinder):

7) What is meant by?

1. Matter :.....
2. Mass :.....
3. Volume :

8) Cross the odd word out in each of the following:

1. Gram – kilogram – kilometer – ton
2. Meter – kilometer – centimeter – ton
3. Cubic meter – liter – kilogram – cubic centimeter
4. Cm^3 – ml – kg – L
5. Kilometer – meter – common balance – centimeter
6. Cm^3 – cm – liter – m^3

9) Give reason for each of the following:

1. Air is matter?
.....
2. Glass (or book or car or) is matter?
.....
3. Air has a volume?
.....

10) Answer the following questions:

- A. If the dimensions of a book are 5, 2 and 2 cm, find the volume of the book.

B. Find the volume of a stone knowing that a graduated cylinder contain 40 cm^3 of water, then the stone was pit in it, the level of water becomes 90 cm^3

C. Mention the name of the tool, which is used for measuring length?

D. Find the volume of a box that its length 4 cm, its width 3 cm and its height 2 cm.

E. A graduated cylinder has 30 cm^3 of water; we put a stone in it and raised the water level to 50 cm^3 . Calculate the volume of the stone.

F. You have a mobile phone that its length equals 8 cm, its width is half its length and its height is 2 cm, calculate its volume.

G. Complete the following table:

Tools	G.tape	C.balance	G.cylinder
Name			
Importance			

H. Write the suitable tool or device that is used in the following process by choosing the correct word from below:

(Sensitive balance – graduated tape – commercial balance – measuring cylinder)

- I. Measuring the volume of liquids (.....)
- II. Measuring the length, width and height (.....)
- III. Measuring small masses (.....)
- IV. Measuring the masses of vegetables and fruits (.....)

I. Ahmed wants to buy some things, help him use the suitable measuring units:

Things that Ahmed wants to buy	Suitable measuring units
1. Tomatoes to make salad
2. Gold ring for his mother
3. Cloth to make a shirt

Revision on Unit 1 Lesson 2 States of matter

1) Complete the following:

1. States of matter are, and
2. have a definite shapes and volumes.
3. Solids have.....shape and volume.
4. The solid substance have definite and, while have definite volumes and take the shape of containers.
5. At ordinary room temperature, water exists in the state.
6. Water has definite
7. Liquids have definite and don't have definite
8. take the shape of container, while..... have definite shape and volume.
9. Matter can be pressed inside cylinders in its state.
10. State of matter can be pressed as it has shape and volume.
11. Air is a matter, because it hasn't a definite and
12. Water vapour is an example for state.
13. Both And have definite volumes.
14. Matter can change from one form to another by or
15. Melting is the change of matter from state to state.
16. When ice melts, it changes from the state to the state.
17. By cooling, water changes from..... state to state.

18. The transfer of matter from liquid state to the gaseous state is called
19. Evaporation is the change of matter from State to State by heating.
20. Decreasing the temperature of water vapour changes it from State to state.
21. Decreasing water temperature changes it from..... state to.....state.
22. Condensation is the change of matter from..... to
23. When water vapour touches a cold surface, it becomes

2) Correct the underlined words:

1. Matter exists in four states.
2. At ordinary room temperature, there are three states of matter.
3. Liquids have definite shapes and definite volumes.
4. Solids have definite volume but they take the shape of container.
5. Boiling is the change of liquids into solids.
6. Solids change their shapes and volumes according to the container.
7. Freezing is the change of matter from the liquid state to the gaseous state.
8. Evaporation is the change of matter from gaseous state into liquid state by cooling.
9. On decreasing the temperature of water, it condenses.

3) Put (✓) or (X) and correct the wrong ones:

1. Liquid matters have definite shape and volume. ()
2. Ice transferred into water by heating. ()
3. At ordinary temperature a matter exists in one state only. ()
4. Oil, water and wood are liquid materials. ()
5. On heating a piece of wax it melts. ()
6. Matter exists in four states. ()
7. Gases have definite shapes and volumes. ()
8. Milk always takes the shape of its container. ()
9. Solid change into liquid by heating. ()

10. Matter can be pressed in case of its gaseous state. ()

4) Write the scientific term for the following:

1. A state of matter that have definite shape and volume. ()
2. A state of matter that have indefinite shape and volume. ()
3. A state of matter that have definite volume and indefinite shape. ()
4. The change of matter from solid state to liquid state. ()
5. The change of matter from liquid state to solid state by cooling. ()
6. The change of matter from liquid state to gaseous state by heating. ()
7. The change of gaseous state to liquid state by cooling. ()
8. Changing of ice into water. ()
9. The change of water into water vapour. ()

5) Choose the correct answer:

1. Changing matter from gaseous state to liquid state is called.....
a) evaporation b) condensation c) melting d) freezing
2. Condensation is the change of matter
a) From gas to liquid b) from liquid to gas c) from liquid to solid
3. have definite shape and definite volume.
a) solids b) liquids c) gases
4. There are States of water
a) 5 b) 4 c) 3
5. can be pressed inside cylinders.
a) liquids b) solids c) gases
6. Matter has indefinite shape and indefinite volume.
a) liquids b) gaseous c) solids
7. The matter can be pressed in state
a) liquid b) gaseous c) solid

8. On decreasing the temperature of water vapour, it

- a) melts b) freezes c) condenses

9. All of these matters have definite volume and definite shape except.....

- a) alcohol b) stone c) ice d) iron

6) Define each of the following:

1. Melting:.....

2. Freezing:.....

3. Evaporation:.....

4. Condensation:.....

7) Give reason for the following:

1. Milk is a liquid matter?

2. Gold and copper are solids?

3. Air is considered as a gaseous matter?

4. The presence of some droplets of water on a glass filled with ice?

8) What happens when?

1. Rising the temperature of ice?

2. You leave a glass containing ice in the air?

3. You decrease the temperature of water vapour?

4. You expose water vapour to a cold glass sheet?

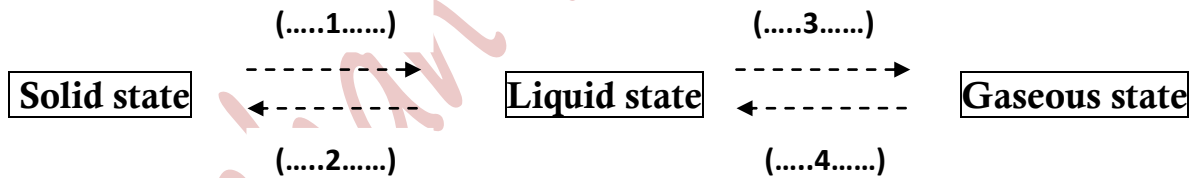
5. Putting a bottle of water in freezer?

6. We boil some water into kettle (or a pot)?

9) Choose from column (B) that is suitable for column (A):

(A)	(B)
1. Change of matter from the liquid state into gaseous state	a. Melting
2. Change of matter from the solid state to liquid state	b. Freezing
3. Change of matter from the liquid state to solid state	c. Condensation
4. Change of matter from the gaseous state to liquid state	d. Evaporation

10) Complete the following figure:



(1) is

(2) is

(3) is

(4) is

Unit 1 Lesson 2

States of matter and their changes

Matter exists in 3 states are solid, liquid and gas.

المقصود بالـ **states of matter** هي حالات المادة أي الصورة التي توجد عليها المادة والمادة ممكن ان توجد في ثلاث حالات إما الحالة الصلبة أو الحالة السائلة أو الحالة الغازية.

The three states of matter are

Solid state

(ice, iron , wood, ...)



Ice



Iron



Wood

Ex: sugar-iron-copper-salt

Liquid state

(water, oil, milk, ...)



Water



Milk



Oil

Ex: Mercury-kerosene-alcohol

Gaseous state

(Air, carbon dioxide, water vapour, ...)



Air



Carbon dioxide



Water vapour

Ex: oxygen-nitrogen

For example: Water can exist in three states: الماء ممكن ان تتواجد في الثلاث حالات للمادة وهي الحالة الصلبة والسائلة والغازية

- 1) Snow (ice) الثلج → a solid state الحالة الصلبة
- 2) Water الماء → a liquid state الحالة السائلة
- 3) Water vapour بخار الماء → a gaseous state الحالة الغازية

Now, we will study each state of matter.

Solid matter

Solid matter has a definite shape and definite volume

المواد الصلبة لها شكل ثابت وحجم ثابت

To prove that, let's do the following activity:

Activity 1

Steps → put a marble in a cylinder containing water

الخطوات: نضع الـ marble في cylinder به ماء كما بالشكل

Observation → shape of marble doesn't change

نلاحظ أن شكل الـ marble لم يتغير

Conclusion → solid matter has a definite shape

نستنتج أن الـ solid marble لها شكل ثابت ومحدد

هل حجم الـ marble تغير ؟ الإجابة لا.. لاننا لو قيسنا حجمها في هذا الـ cylinder

ووجدنا ان حجمها مثلا 20 سم³ ثم قيسناها في cylinder اخر سوف نجد ان حجمها ايضا 20 سم³

∴ **Solid matter has a definite shape and a definite volume**

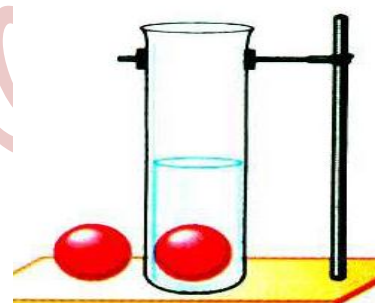
Give Reason: Why

1- Gold and copper are solids?

Answer: Because they have definite shape and volume

2- Copper has definite shape and volume

Answer: Because it is a solid matter



Marble

Liquid matter

Liquid matter has indefinite shape and definite volume المواد السائلة ليس لها شكل ثابت ولها حجم ثابت ومحدد

To prove that, let's do the following activity:

Activity 2

Steps → put 50 cm³ of liquid in 3 different cylinders.

نضع حوالي 50 سم³ من الماء في 3 اشكال مختلفه من الـ cylinder



Observation → shape of water changes and take the shape of cylinders

نلاحظ أن شكل الماء يتغير والماء تأخذ شكل الإناء الذي توضع فيه

Observation → shape of water changes and take the shape of container

نلاحظ أن شكل الماء يتغير وتأخذ شكل الإناء الذي توضع فيه

Conclusion → Liquid matter has indefinite shape and takes the shape of container

نستنتج أن الـ liquid ليس لها شكل محدد أو ثابت

هل حجم الـ water تغير ؟ الإجابة لا.. لاننا لو قيسنا حجمها في هذا الـ cylinder

ووجدنا ان حجمها مثلا 20 سم³ ثم قيسناها في cylinder اخر سوف نجد ان حجمها ايضا 20 سم³

نستنتج أن حجم الـ liquid لم يتغير ولها حجم ثابت

∴ Liquid matter has indefinite shape and a definite volume

(Liquids take the shape of container)

Give Reason: Why

1- Oil is a liquid?

Answer: Because they have indefinite shape and definite volume

2- Water has indefinite shape and definite volume

Answer: Because it is a liquid matter

Gas matter

Gas matter has indefinite shape and indefinite volume

To prove that, let's do the following activity:

Steps → blow air in a balloon and press it by hand

الخطوات: ننفخ البالون ونضغط عليه باليد. مثل ضغط الغاز في أنبوبة البوتاجاز

Observation → gases take the shape and volume of container

نلاحظ أن شكل الـ air يتغير داخل البالون وحجمه يتغير لأنه يمكن ضغط كميته كبيره من الغاز داخل الأنبوبة

Conclusion → gases take the shape and the volume of container

نستنتج أن gases ليس لها شكل أو حجم ثابت ولكنها تأخذ شكل وحجم الوعاء



∴ Gases matter has indefinite shape and indefinite volume

(Gases take the shape and volume of container)

Compare between solid, liquid and gases (3 states of matter)

	Solids	Liquids	Gases
Volume	definite	definite	indefinite
Shape	definite	indefinite	indefinite

Remember

- Solid matter has definite shape and definite volume.
- Liquid matter has indefinite shape and definite volume (liquids take the shape of container).
- Gases matter has indefinite shape and indefinite volume (gases take the shape and volume of the container).

Changes of matter

At ordinary **room temperature** (25°C), any matter exists in **only one state**

في درجة حرارة الغرفة تتواجد المادة في حالة واحدة فقط

For example: water exists in only one state at ordinary room temperature

نأخذ مثال للمادة وهي الماء تتواجد في حالة واحدة فقط (one state) عند درجة حرارة الغرفة (25°C) وهي حالة الـ liquid state

Matter can change from one state to another state by **heating** or **cooling**

Example: water converts from liquid state to solid state (ice) by cooling (عملية التجميد)

أي أن الماء يتحول من الحالة السائلة إلى الحالة الصلبة (الثلج) عن طريق عملية التجميد

Freezing: is the change of matter from **liquid state** to **solid state** by **cooling**

Example: water converts from liquid state to gas state (water vapour) by heating (عملية التبخر)

أي أن الماء يتحول من الحالة السائلة إلى الحالة الغازية (بخار الماء) عن طريق عملية التبخر

Evaporation: is the change of matter from **liquid state** to **gas state** by **heating**

Also, when you heat some ice cubes, you observe that ice (solid) changes into water (liquid) by heat. This process is called **melting**

عند تسخين بعض مكعبات الثلج في كوب زجاجي نلاحظ أن الثلج (صلب) يتحول إلى ماء (سائل) .. هذه العملية تسمى الانصهار

Melting: is the change of matter from **solid state** to **liquid state** by **heating**

هل لاحظت من قبل الظواهر الآتية?

- قطرات ماء علي السيارات والنباتات. Appearance of water drops on cars and plant leaves in winter.
- وجود قطرات ماء علي غطاء البراد. Appearance of water drops on cover of tea pot
- قطرات الماء علي كوب به ثلج. Appearance of water drops on glass has ice

In the previous examples, the process that causes the formation of water drops is known as condensation.

Condensation: is the change of matter from **gaseous** state to **liquid** state by **cooling**

Give Reason:

- 1- Appearance of water drops on cars and plant leaves in morning?
- 2- Appearance of water drops on cover of tea pot?
- 3- Appearance of water drops on glass has ice?

Answer: Due to condensation of water vapor.

What happen when ماذا يحدث عند

- 1- Put a glass of ice on air

Answer: it makes water drops on glass

- 2- Put a glass of water in freezer

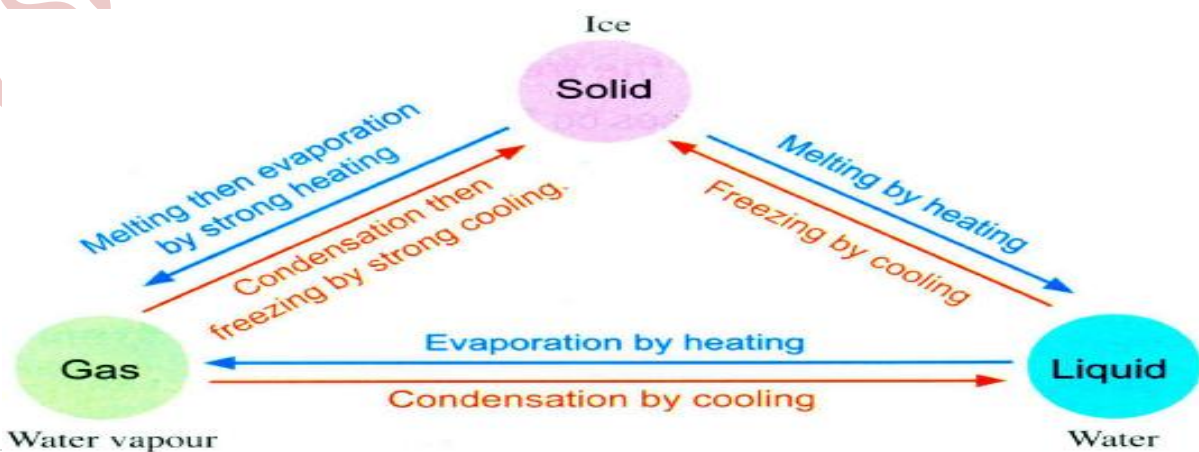
Answer: water will freeze into ice.

Give reason: A bottle of water is broken in freezer?

Because ice has volume larger than water.

Remember

- **Freezing:** it is a change of matter from **liquid** state into **solid** state by **cooling**.
- **Melting:** it is a change of matter from **solid** state into **liquid** state by **heating**.
- **Melting:** is the change of matter from **solid** state to **liquid** state by **heating**.
- **Condensation:** is the change of matter from **gaseous** state to **liquid** state by **cooling**.



Vocabulary

States	حالات
Changes	تغييرات
Exist	يوجد
Definite	محدد
Indefinite	غير محدد
Shape	شكل
Copper	نحاس
Container	وعاء
Blow	ينفخ
Press	يضغط
Heating	تسخين
Cooling	تبريد
Converts	تتحول
transfer	تحول
Melting	إنصهار
Freezing	تجمد
Evaporation	تبخير
Condensation	تكثيف
Ordinary room temperature	درجة حرارة الغرفة

Melting	إنصهار
Freezing	تجمد
Evaporation	تبخير
Condensation	تكثيف
Drops	قطرات
Tea pot	براد الشاي
Increasing	زيادة
decreasing	تقليل
Take the shape	تأخذ شكل
wax	الشمع
expose	يعرض
Kettle	الغلاية
pot	البراد

Unit 1 Lesson 3

Elements around us

Now, we know that: Matter is anything has mass and volume

تعلمنا من الدرس الأول أن الـ **matter** هي أي شئ حولنا له كتله وحجم (مثل الكرسي أو الكرة أو الموبايل أو.....)





What is the meaning of elements?

هل يمكن تحويل المسامير إلى ذهب أو فضة؟؟ الإجابة هي طبعاً لا.... لماذا؟ لأن المسامير مصنوعة من الحديد (iron) والحديد هو **element** موجود في الطبيعة كما هو ولا يمكن تحويل المسامير الحديد إلى أي شئ آخر (can't be analyzed into two substances or more)

- **Element:** is the simplest form of matter that can't be analyzed (decomposed) into two substances or more.

أي أن الـ **element** هي أبسط صورته من الـ **matter** والـ **element** لا يمكن أن نجعله في صورته أبسط وذلك لأن الـ **element** هو شئ موجود في الطبيعة كما هو ولا يمكن تحويله إلى صورته أبسط.



Matter	Element that composes it
 <ul style="list-style-type: none"> • Nails. 	<ul style="list-style-type: none"> • Iron element.
 <ul style="list-style-type: none"> • Spoon. 	<ul style="list-style-type: none"> • Aluminium element.
 <ul style="list-style-type: none"> • Coal. 	<ul style="list-style-type: none"> • Carbon element.
 <ul style="list-style-type: none"> • Electric wire. 	<ul style="list-style-type: none"> • Copper element.

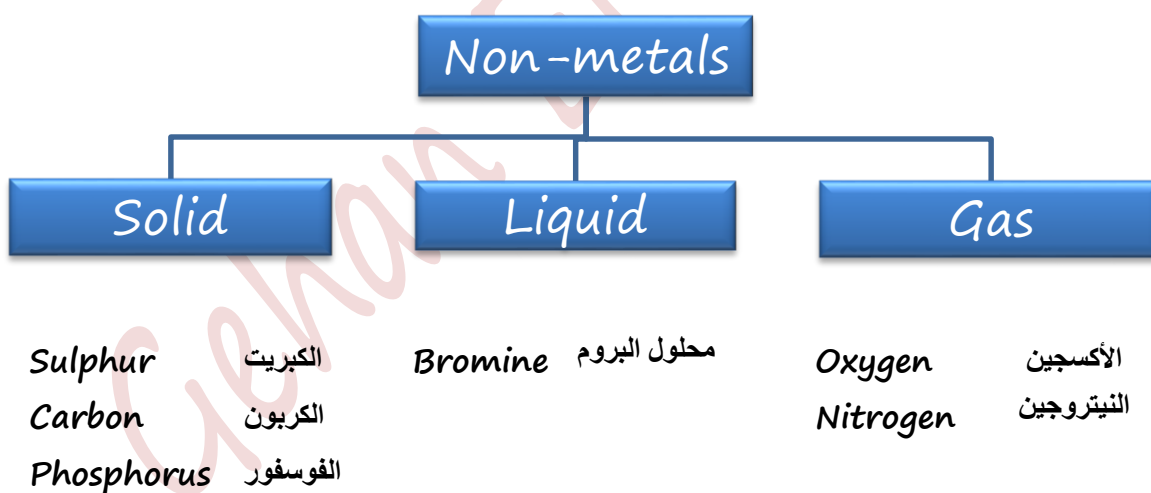
Elements are classified into

- Metals (الفلزات)
- Non-Metals (اللافلزات)



Note that: all metals are solids except mercury

كل الـ metals او الفلزات صلبة ماعدا الزئبق




Complete the following:

- 1) is the building unit of matter.
- 2) Elements are classified into..... and
- 3) is the liquid metal, while is the liquid non-metal.
- 4) Iron is considered as a, while Sulphur is a
- 5) Sulphur and are solid non-metals, while nitrogen andare gaseous non-metals.

Properties of metals and non-metals: خواص الفلزات واللافلزات

Points of comparison	Metals	Non-metals
Luster (shiny) اللمعان	They have metallic luster (are shiny). الفلزات لامعة مثل الحديد والالومنيوم والنحاس 	They don't have metallic luster (are not shiny). اللافلزات لا تلمع 
Malleability or hammering الطرق والسحب	They are malleable (can be bent) or can be hammered to form sheets. الفلزات قابله للثني أو الطرق 	They are not Malleable (can't be bent) Or can't be hammered. اللافلزات غير قابله للثني أو الطرق ولكن يتم تكسيرها 
Conductivity of heat توصيل الحرارة	They are good conductors of heat. الفلزات موصله جيده للحرارة 	They are bad conductors of heat. اللافلزات غير موصله جيده للحرارة 
Conductivity of electricity توصيل الكهرباء	They are good conductors of electricity. الفلزات موصله للكهرباء 	They are bad conductors of electricity (except carbon) اللافلزات غير موصله جيده للكهرباء ماعدا الكربون 
Melting and boiling points درجة الإنصهار والغليان	They have high melting and boiling point الفلزات لها درجة إنصهار وغليان عاليه 	They have low melting and boiling point اللافلزات لها درجة إنصهار وغليان منخفضه 
The state at room temperature حالة المادة عند درجة حرارة الغرفة	They are solids except mercury is liquid. الفلزات صلبه في درجة حرارة الغرفة ماعدا الزئبق فهو سائل	They are: - Solid: as sulphur, carbon and phosphorus. - Liquid: as bromine - Gases: as oxygen and nitrogen.

The economic importance of metals and non-metals: أهمية وإستخدامات الفلزات واللافلزات

Element	Kind	Importance (uses)
Iron	Metal	It used in making:  Bridges  Car chassis (car frames)  Doors  Street lights (lamp posts)
Aluminum	Metal	It is used in the manufacture of:  Cooking pans  Foil paper  Doorknobs
Gold and silver	Metal	It used in making:  Jewellery
Copper	Metal	It used in making:  Electric wires  Statues  Metallic coins
Carbon (graphite)	Non-metal	It is used to make the positive electrodes of dry cell (batteries).  Dry cells (batteries)

Give reason: electric wires are made of copper?

Answer: because copper is a good conductor of electricity.

Give reason: we mustn't approach nail to an electric source?

Answer: because the nail is made of iron which is metal and a good conductor of electricity.

Revision on Unit 1 Lesson 3 Elements around us

1) Complete the following:

1. Elements are classified into..... and
2. is the liquid metal, while is the liquid non-metal.
3. The liquid non-metal is.....
4. A group of..... have metallic luster (shiny).
5. The group of elements that have luster is known as.....
6. Iron is used in making
7. We can use..... in manufacturing bridges.
8. is good conductor of electricity, while is bad conductor of electricity.
9. Electric wires are made of copper because copper is..... conductor of.....
10. Electric wires are made up of, while bridges are made of
11. The melting point of iron, gold and silver is
12. The positive poles of the dry cells are made up of element.
13. We use in manufacturing jewels.
14. Group of has luster, while the group of.....doesn't have luster.
15. All metals are good conductors of And
16. Copper and graphite are good conductors of.....
17. Silver is shiny element, it belongs to the..... group, while sulphur is an element has no luster so it belongs to..... group.

2) Give reason for the following:

1. Carbon is used in manufacturing of poles of dry cells?
2. The poles of the dry cells are made of graphite?
3. Cooking pans are made of aluminium?
4. Copper is used in making electric wires?

3) Put (✓) or (X) correct the wrong ones: :

1. All metals are solids. ()
2. All metals are solid elements except mercury ()
3. Metals have low melting point. ()
4. Carbon is good conductor of electricity. ()
5. Metals are bad conductors of heat and electricity. ()
6. Non-metals elements have low melting and boiling points. ()
7. Carbon and sulphur have no luster. ()
8. Sulphur is from non-metals. ()
9. Bromine is a liquid metal. ()

4) Correct the underlined words:

1. Bridges and lamp posts are made from aluminium.
2. Gold is non-metal which is used in making batteries.
3. The non-metal which is a good conductor of electricity is sulphur.
4. Mercury is a liquid non-metal.

5) What happened when ... ?

1. Connecting a piece of sulphur in an electric circuit containing a lamp.

6) Choose the correct answer:

1. The cooking pots are made of
a) graphite b) aluminum c) sulphur d) wood
2. is a metal used in making electric wires
a)aluminum b)Copper c) Iron d) Carbon
3. An example of non-metal.....
a) iron b) carbon c) copper
4. An example of non-metal.....
a) copper b) sulphur c) iron d) gold
5. is from metals.
a) Carbon b) Sulphur c) Copper
6. Gold and silver are used in manufacturing of.....
a) bridges b) jewels c) doors
7. is the simplest form of matter that can't be analyzed.
a) Atom b) Element c) Molecule
8. Electric wires are made of.....
a) sulphur b) carbon c) copper
9. All the following are elements except
a) carbon dioxide b) oxygen c) iron
10. has low melting point.
a) Aluminium b) Sulphur c) Copper
11. Sulphur is non-metal, because

a) it is shiny b) it has high melting point c) it is a bad conductor of heat and electricity

12. Iron is used in making.....

a) car chassis b) statues c) wires d) dry cell

13. Car frames and bridges are made of.....

a) iron b) aluminium c) copper

14. The only metal that exists in liquid state is.....

a) mercury b) oxygen c) bromine

15. is a good conductor of heat and electricity.

a) Copper b) Carbon c) Sulphur

16. The melting points of the following elements are low except.....

a) sulphur b) copper c) carbon d) phosphorus

7) Mention one use for :

1. Copper:
2. Gold:.....
3. Carbon:.....
4. Iron:.....

8) Write the scientific term:

1. The simplest form of matter that can't be analyzed into simpler form. ()
2. The liquid non-metal. ()
3. The liquid metal. ()
4. It is the simplest form of matter can't be analyzed. ()
5. A group of elements have metallic luster. ()
6. The group of elements that have no luster. ()
7. An element used in making cooking pots. ()
8. A metal which is used in making electric wires. ()
9. Non-metal which is good conductor of electricity. ()
10. An element used in making statues and metallic coins. ()

11. The group of elements that is not malleable.

()

12. A group of elements that have low melting points.

()

9) Cross the odd words:

1. Iron – copper – aluminum – mercury
2. Aluminium – carbon – sulphur – phosphorus
3. Bromine – carbon – phosphorus – sulphur
4. Aluminium – mercury – iron - sulphur

10) Compare between:

1. Metals and non-metals according to (shining – conductivity of heat)

Revision on

Unit 1 Lesson 4

Physical and chemical changes

1) Complete the following:

1. Burning of wood is a change.
2. Dissolving sugar in water is a change.
3. Dissolving salt in water is a change.
4. Iron rusting is a change.
5. Leaving iron in wet air is a change.
6. Grinding of sugar is a change, while iron rust is achange.
7. Burning of wood is considered as Change, while cutting of paper is considered as a change.
8. Melting of ice is a Change, while burning of wood is a change.
9. Melting of wax is a Change.
10. Adding yeast in baking is considered is considered as a change.
11. Burning of paper is a Change.
12. Dissolving of table salt in water is a, while burning of sugar is a change.
13. Grinding of sugar into powder is
14. Melting of wax is a change, while burning of wax is a Change.

2) Give reason for the following:

1. The melting of ice is a physical change?
2. Iron rust is a chemical change?
3. Burning of wax is a chemical change?

3) Correct the underlined words:

1. Sugar keeps its properties after burning.
2. Rotten of fruits and their fermentation is considered as a physical change.

4) Write the scientific term:

1. The change in the shape of matter without any change in the structure. (.....)
2. The change that occurs in the appearance of the matter only. (.....)
3. The change in appearance of the matter without the change in its structure. (.....)
4. A change in the shape and the structure of matter. (.....)
5. The change of a piece of chalk into powder. (.....)
6. The change occurs when dissolving sugar in water. (.....)
7. A chemical change happens to iron when is put in water. (.....)

5) Mention the type of change (physical or chemical change):

1. Melting of ice (.....)
2. Iron rust (.....)
3. Grinding of sugar (.....)

6) Classify the following examples in the table below:

1. Sugar dissolving in water.
2. Wood burning.
3. Iron rusting.
4. Wax melting.
5. Burning of sugar.
6. Melting of chocolate.
7. Production of yoghurt from milk.
8. Dissolving of salt in the water and formation of salty solution.

Physical change	Chemical change
.....
.....
.....
.....

Unit 1 Lesson 4

Physical and chemical changes

There are two types of changes that may occur to matter:

- If you cut a paper into pieces, its **shape only changes**.

So we can say that it is a **physical change**.

عند قطع الورقة إلى قطع صغيرة - نجد أنه حدث تغير في شكل الورقة فقط

هذا التغير يسمى تغير فيزيائي (تغير في الشكل فقط)



- If you burn a paper, its **shape and structure changes**.

So we can say that it is a **chemical change**.

عندما نحرق ورقة - نجد أنه حدث تغير في شكل وتكوين الورقة وتحولت الورقة إلى

ماده أخرى. هذا التغير يسمى تغير كيميائي.



التغير في المادة إما أن يكون (تغير كيميائي) أو (تغير فيزيائي)

Changes of matter may be:

Physical change

Chemical change

Physical change: is the change in the shape of matter without any change in its structure (properties).

التغير الفيزيائي : هو التغير في شكل المادة فقط بدون حدوث تغيير في خصائص المادة.




Examples on physical change:-

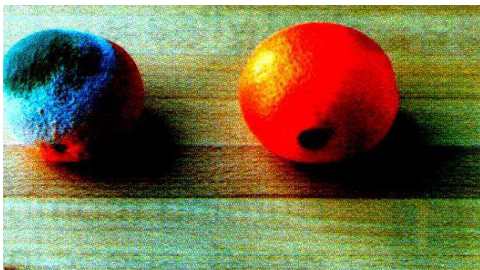
1	<p>The change of water from one state to another (ice cycle).</p> <p>تغير الماء من حاله الي اخري (من صلبه الي سائله أو من سائله الي غازيه أو)</p>	<p>Changes of State</p>
2	<p>Melting of any solid matter such as wax, chocolate and ice cream.</p> <p>ذوبان أي ماده صلبه مثل الشمع أو الشيكولاته أو الأيس كريم</p>	
3	<p>Grinding of sugar or chalk into powder.</p> <p>طحن السكر أو الطباشير إلي بودره</p>	
4	<p>Dissolution (dissolving) of sugar or salt in water.</p> <p>ذوبان السكر أو الملح في الماء</p>	
5	<p>Cutting paper into small pieces and paper recycling.</p> <p>تقطيع الورقة إلي أجزاء صغيره</p>	
6	<p>Malleability of elements to form sheets or wires (bending of element).</p> <p>ثني المواد لعمل شبيطات وأسلاك</p>	

Chemical change: is the change in the shape and structure of matter producing a new substance or new substance with different properties.

التغير الكيميائي: هو التغير في شكل ومضمون المادة ويتم انتاج ماده أخرى لها خصائص مختلفه

Examples on chemical change:-

1	Combustion (burning) of any matter as wood, sugar, paper, fuel, حرق أي ماده مثل الخشب أو السكر أو الورق أو الوقود أو ...	
2	Rusting of iron. صدأ الحديد	
3	Production of yoghurt from milk. إنتاج الزبادي من اللبن	
4	Addition of yeast to pastry. إضافة الخميرة للمعجنات	
5	Adding sodium bicarbonate to vinegar. إضافة بيكربونات الصوديوم إلي الخل	
6	Digestion of food. هضم الطعام	

7	<p>Rot and fermentation of fruits.</p> <p>تخمير وتتعفن الفواكه</p>	
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Give reason: 1) Burning of wood is a chemical change?

Answer: because burning of wood cause a change in its shape and structure producing a new substance with new properties.

Give reason: 2) Melting of ice is a physical change?

Answer: because melting of ice cause a change in the shape of water only without any change in water structure.

Unit 2 Lesson 1

Stars and planets

If you look at the sky in a clear light, you will see **shining bodies** with different sizes that **emit light**. These bodies are called **stars**. Our sun is the nearest star to Earth.



نظروا إلى السماء في الليل نرى أجساماً مضيئة لها أحجام مختلفة وتشتع ضوءاً.
هي أقرب النجوم إلينا.

Stars: they are shining (lightning) bodies that emit heat and light.

: هي أجسام مضيئة تشتع ضوءاً وحرارة

Stars are characterized by the following:

- 1) They are shining bodies that rotate in space. أجسام مضيئة تسبح في الفضاء
- 2) They emit heat and light.
- 3) They have different sizes (big, medium and small) (كبيرة ومتوسطة وصغيرة)

Give reason: Stars in the sky appears very small to us although they are huge bodies?

Answer: Because stars are very distant (far) from us.

لماذا نرى النجوم صغيرة الحجم بالرغم من أنها أجسام ضخمة جداً ؟ لأن النجوم بعيدة جداً عننا فبالتالي نراها صغيرة.

Complete the following sentences:

- 1) are lightning celestial bodies that rotate in space.
- 2) Stars emit and
- 3) Big stars look very small to us, because they are..... from us.

• The solar system includes:

1) The sun

2) The eight planets

3) Moons

4) Other celestial bodies such as : جرام السماوية مثل الكويكبات و الشهب والنيازك ومذنبات

a) Asteroids

b) Meteors

c) Meteorites

d) Comets

1. The sun

- The sun: it is a **shining star** that radiates **light** and **heat**; it is the nearest star to us.

: هو نجم مضئ يشع ضوء وحراره. وهو النجم الأقرب للكرة الأرضية

a) Give reason: **the sun is a star**? Because it **radiates (emits) heat and light**.

b) The sun is located in the **center** of the solar system.

c) It is the **largest (biggest)** body in the solar system.

d) Give reason: Although the sun is a **medium-sized star**, it seems the biggest one to us?

Because it is the **nearest star** to us compared with the other stars.

تبدو أكبر النجوم التي نراها ؟ لأن الشمس هي أقرب النجوم إلينا بالمقارنة مع باقي النجوم

Complete the following sentences:

1) is the biggest body in the solar system.

2) The sun is a star as it emits and

3) The solar system consists of the sun,, and other celestial bodies.

4) The sun is a-sized star.

5) is the nearest star to us.

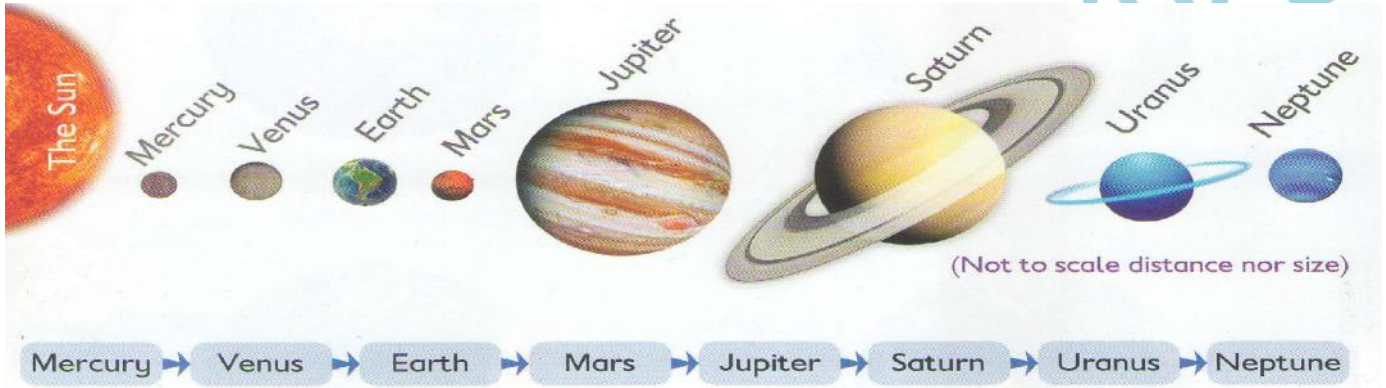
2. The eight planets

- Planets: they are **eight dark bodies** that revolve around the sun in **fixed orbits**.

: عددھم ثمانية كواكب مظلمة تدور في مدارات ثابتة حول الشمس

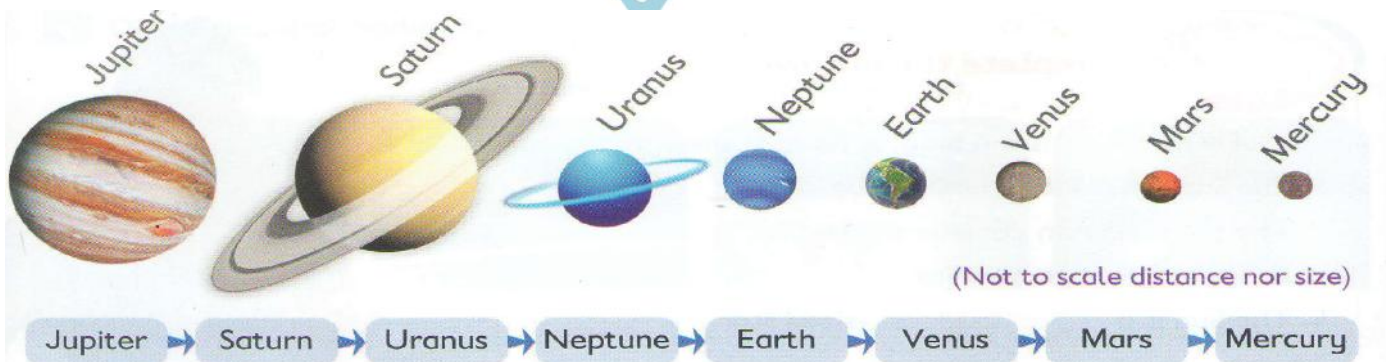
→ Planets are arranged according to their distances from the sun (nearest to farthest)

as follow: (ترتيب الكواكب من حيث البعد عن الشمس (ترتيب من الأقرب للأبعد



→ Planets are arranged according to their sizes (biggest to smallest) as follow:

ترتيب الكواكب من الأكبر للأصغر

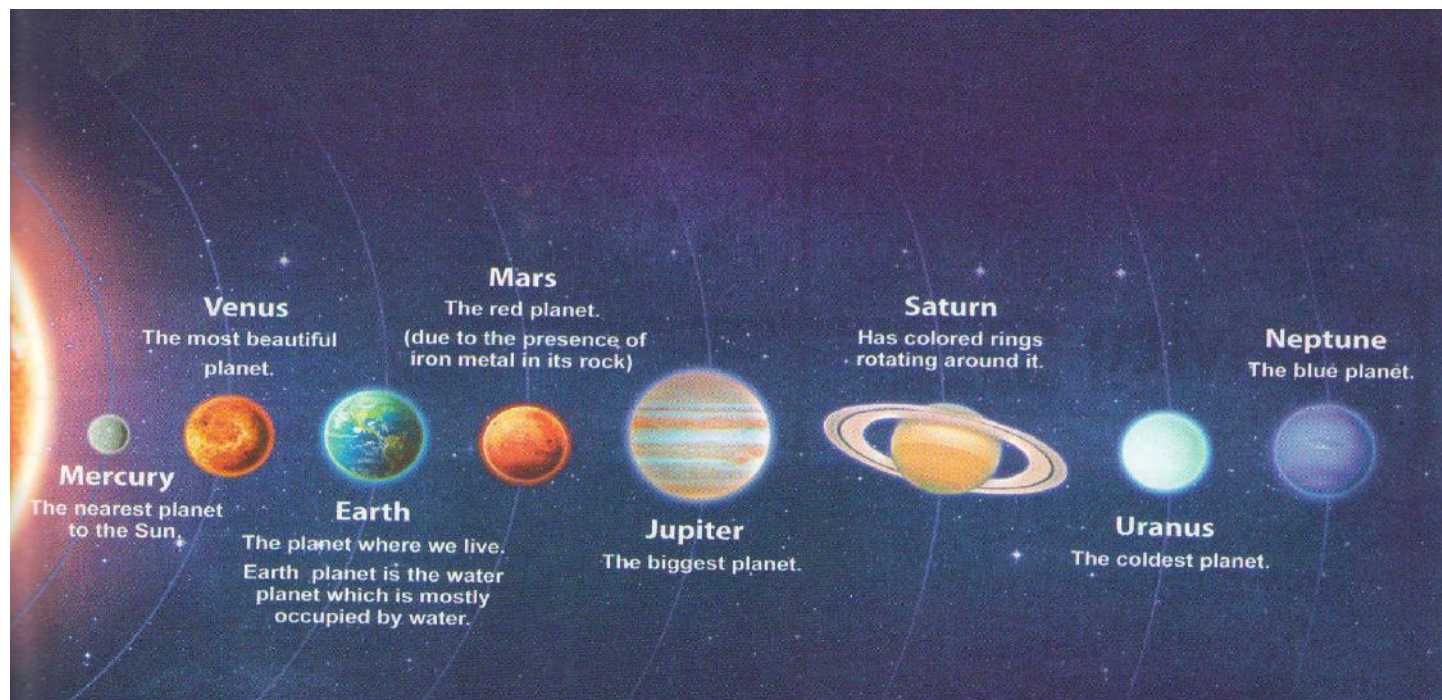


Note that:

- The nearest planet to the sun is **Mercury**.
- The farthest planet from the sun is **Neptune**.
- The biggest planet is **Jupiter**.
- The smallest planet is **Mercury**.
- Earth lies between **Venus** and **Mars**.

Give reason: Jupiter is a planet? Because it is a dark body that revolves around the sun

in a fixed orbit.



3. Moons

- The moon: is a **dark body**, but it seems **shiny (luminous)** because it reflects the sunlight falling on its surface. : هو جسم مظلم يبدو مضيئا لأنه يعكس ضوء الشمس الساقط على سطحه

Give reason: The moon is a dark body but we see it shining (luminous)? Because it reflects the sunlight falling on its surface.

Note that:

- The moon is the nearest neighbor to us in space
- The moon is a follower of the planet; each planet has a number of moons except Mercury and Venus.

الأقمار تكون تابعة للكواكب وكل كوكب يتبعه مجموعه من الأقمار ماعدا Venus Mercury لا يتبعهم أي أقمار مثلا:

The number of moons revolving around the eight planets:

Mercury	Venus	Earth	Mars	Jupiter	Saturn	Uranus	Neptune
No moons	No moons	1	2	62	60	27	13

A comparison between stars, planets and moons

Stars



- They are shining bodies.
- They emit heat and light.
- They rotate in space.

Ex. the Sun

Planets



- They are dark bodies.
- They do not emit heat or light.
- They rotate in space around the Sun.

Ex. Earth

Moons



- They are dark bodies.
- They reflect the sunlight falling on them.
- They rotate in space around the planets.

Ex. the Moon.

Write the scientific term for each of the following:

1) the nearest planet to the sun

()

2) the farthest planet from the sun

()

3) the coldest planet

()

4) the most beautiful planet

()

5) the planet where we live

()

Revision on



1) Complete the following:

1. are shining bodies that emit heat and light.
2. The sun is a, while Earth is a
3. Planets are bodies that revolve around the sun in fixed orbit.
4. Earth is located between and
5. The nearest planet to the sun is
6. The central body in the solar system is
7. The biggest planet is
8. The sun is a star because it
9. We see the moon shining because it
10. is the smallest planet, while is the farthest planet from the sun.
11. Mars is known as, while Neptune is known as
12. Stars seem very small because they are very
13. is the nearest star to us.
14. The sun is a which radiates and heat.
15. The solar system includes,, and
16. is the biggest body in solar system, while is the biggest planet.
17. The number of planets that revolve around the sun is

18. The planets in solar system are Venus, Mars,
Saturn, and
19. The biggest planet is, while is the smallest planet.
20. is the blue planet, while Uranus is the planet.
21. is the planet where we live.
22. is the most beautiful planet, while is the coldest planet.
23. The smallest planet is, while the biggest planet is
24. Planets revolve around, while moons revolve around
25. is the red planet, while is the blue planet.
26. Mars is known as the planet, while Neptune is the planet.
27. The sun appears to us than the other stars because it is the nearest star to us.
28. Stars are shining bodies, while planets are

2) Give reason for the following:

1. The sun is a star, while Earth is a planet?
2. Stars seem very small in size?
3. Although the moon is a dark body, we see it shining? Or the moon seems luminous?
4. The sun seems bigger to us than the other stars?

3) Correct the underlined words:

1. The sun is a big star. (.....)
2. Earth is a star while the sun is a planet. (.....)

3. The sun is a planet and it emits light. (.....)
4. Stars are dark bodies. (.....)
5. The number of planets in solar system is ten. (.....)
6. Earth is the fourth planet away from the sun. (.....)
7. Jupiter is the most beautiful planet. (.....)
8. The sun is the biggest planet in the solar system. (.....)
9. The number of stars in solar system is two. (.....)
10. The Moon is a dark body that revolves around the sun. (.....)
11. Neptune has colored rings rotating around it. (.....)
12. Mercury is the planet where we live. (.....)
13. The farthest planet from the sun is Venus. (.....)
14. The red planet is Uranus. (.....)
15. Saturn is a star (.....)
16. The nearest planet to the sun is Venus. (.....)
17. Earth is the central body in solar system. (.....)
18. Earth is bigger than the sun. (.....)

4) Write the scientific term:

1. Shiny (luminous) bodies radiating light and heat and appear in the sky at night.
(.....)
2. The dark body that revolve around the earth. (.....)
3. The center of the solar system. (.....)
4. Dark objects revolving around the sun in fixed orbits. (.....)
5. The dark bodies that revolves around the sun and which we live in. (.....)
6. The medium sized star. (.....)
7. The nearest star to us. (.....)
8. The nearest planet to the sun. (.....)
9. The most beautiful planet. (.....)
10. The planet where we live. (.....)
11. The red planet. (.....)

12. The biggest planet in the solar system. (.....)
13. The biggest body in solar system. (.....)
14. The planet that has the biggest number of moons. (.....)
15. The sun, the eight planets and other celestial bodies. (.....)
16. The planet which has colored rings rotating around. (.....)
17. The coldest planet in the solar system. (.....)
18. The farthest planet from the sun. (.....)
19. Dark objects revolving around the planets and reflect the sunlight falling on them.
(.....)
20. The smallest planet in the solar system. (.....)

5) Arrange the planets from the nearest to the farthest from the sun:

(Neptune – Earth – Venus – Mars – Uranus – Saturn – Mercury – Jupiter)

6) Arrange the following celestial bodies from the smallest to the biggest:

(The sun – The Earth – Jupiter – The Moon)

7) Choose from column (B) that suits in column (A):

(A)	(B)
1. Mercury	a. The red planet
2. Earth	b. The planet where we live
3. Mars	c. The biggest planet
4. Saturn	d. The smallest planet
5. Neptune	e. Has colored rings

4..... 5..... 6.....

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