

1. Introduction

Look around you. We see many objects such as:

- Books
- Pens
- Tables
- Chairs
- Bottles
- Clothes
- Utensils
- Bags
- Toys
- Glasses

These objects are made from different **materials** such as:

- Wood
- Paper
- Plastic
- Glass
- Metal
- Cloth
- Clay
- Rubber

What is a Material?

A **material** is a substance used to make an object.

For example:

- A chair may be made of **wood**.
- A bottle may be made of **plastic or glass**.
- A notebook may be made of **paper**.

- A cooking vessel may be made of **metal**.

Objects may be made from **one material or a combination of different materials**.

2. Objects and Materials

One object can be made using different materials.

Example: Pen

A pen may contain:

- Plastic
- Metal
- Ink

Similarly, the **same material can be used to make different objects**.

Example: Plastic

Plastic can be used to make:

- Bottles
- Buckets
- Toys
- Pens
- Containers

Therefore, there is no one-to-one relationship between objects and materials.

3. Activity – Identify Materials

Look around your classroom or home.

Make a list of objects and identify the material from which each object is made.

Object	Material
Table	Wood/Metal
Notebook	Paper
Water bottle	Plastic/Glass
Window	Glass

Object	Material
Chair	Wood/Plastic/Metal
Pencil	Wood
Spoon	Metal/Plastic

This activity helps us understand that everyday objects are made from different materials.

4. How Do We Group Materials?

Different objects have different properties.

We can group objects according to properties such as:

- Shape
- Colour
- Hardness
- Softness
- Shine
- Dullness
- Material
- Texture

Classification

Classification is the method of arranging objects into groups based on common properties.

For example:

According to material

Metal group:

- Iron
- Copper
- Aluminium

Wood group:

- Wooden chair
- Wooden table

According to colour

- Red objects
- Blue objects
- Green objects

According to hardness

- Hard objects
 - Soft objects
-

5. Why is Classification Useful?

Classification helps us:

1. Organise objects.
2. Study materials easily.
3. Compare different materials.
4. Identify similarities and differences.
5. Understand patterns in their properties.

We commonly use classification in:

- Homes
- Shops
- Schools
- Laboratories
- Hospitals
- Libraries

For example, a grocery shopkeeper keeps similar items together.

6. Choosing Materials for an Object

The material selected for making an object depends mainly on:

1. **Properties of the material**
2. **Purpose of the object**

Example: Tumbler

A tumbler should be able to:

- Hold water

- Maintain its shape
- Be suitable for handling

Therefore, materials such as:

- Glass
- Plastic
- Steel

can be suitable.

A cloth tumbler would not be suitable because cloth cannot hold water properly.

7. One Object Can Have Many Materials

An object may contain different materials for different purposes.

Example: Pen

A pen may have:

- Plastic body
- Metal clip
- Ink
- Rubber grip

Each material is selected because it has suitable properties.

8. Activity – Different Balls

Different balls may have the same or similar size but may be made of different materials.

Examples:

- Tennis ball
- Cricket ball
- Hand exercise ball

Drop each ball from the same height and observe how high it bounces.

Observation

Different balls may bounce to different heights.

Conclusion

The material of a ball affects its properties and performance.

Therefore, different sports require balls made from suitable materials.

9. Properties of Materials

Materials have different properties.

Important properties studied in this chapter are:

1. Appearance
2. Lustre
3. Hardness
4. Softness
5. Transparency
6. Translucency
7. Opacity
8. Solubility
9. Mass
10. Volume

These properties help us decide which material is suitable for a particular purpose.

10. Appearance of Materials

Different materials have different appearances.

For example:

- Iron looks different from wood.
- Copper looks different from aluminium.
- Paper looks different from glass.

We can observe:

- Colour
- Texture
- Shine
- Smoothness
- Roughness

to identify differences between materials.

11. Lustrous and Non-Lustrous Materials

Lustrous Materials

Materials having a **shiny surface** are called **lustrous materials**.

Examples

- Iron
- Copper
- Zinc
- Aluminium
- Gold

Most metals are lustrous when their surfaces are clean and fresh.

Non-Lustrous Materials

Materials that do not have a shiny surface are called:

Non-lustrous materials

Examples:

- Paper
 - Wood
 - Rubber
 - Jute
-

12. Do All Shiny Materials Contain Metal?

No.

Some non-metallic materials can also appear shiny because their surfaces may be:

- Polished
- Coated with plastic
- Coated with wax
- Covered with another shiny material

Therefore:

Not every shiny material is a metal.

This explains the idea behind the saying:

"All that glitters is not gold."

13. Effect of Air and Moisture on Metals

Some metals may lose their shine when exposed to:

- Air
- Moisture

Their surfaces may become dull.

Therefore, freshly cut surfaces of some metals show more lustre than older exposed surfaces.

14. Hard and Soft Materials

Materials differ in their hardness.

Some materials are:

Hard

They are difficult to:

- Compress
- Scratch
- Change their shape

Examples:

- Stone
- Iron

Soft

They can be compressed or scratched more easily.

Examples:

- Sponge
 - Some rubber objects
 - Candle
 - Chalk
-

15. Hardness is Relative

Hardness is not always absolute.

For example:

Rubber is harder than a sponge but softer than iron.

Therefore, one material can be harder than one material but softer than another.

16. Transparent Materials

Materials through which objects can be seen **clearly** are called:

Transparent Materials

Examples

- Clear glass
- Water
- Air
- Cellophane paper

When light passes through a transparent material, objects behind it can be seen clearly.

17. Opaque Materials

Materials through which we **cannot see objects** are called:

Opaque Materials

Examples

- Wood
- Cardboard
- Metals
- Brick

Opaque materials do not allow us to see clearly through them.

18. Translucent Materials

Materials through which objects can be seen but **not clearly** are called:

Translucent Materials

Examples

- Butter paper

- Frosted glass

They allow some light to pass through but do not allow clear images to be seen.

19. Difference Between Transparent, Translucent and Opaque

Property	Transparent	Translucent	Opaque
Objects can be seen clearly	Yes	No	No
Light passes through	Mostly	Partly	Very little/No
Example	Clear glass	Frosted glass	Wood
Image through material	Clear	Blurred	Not visible

Easy way to remember

Transparent → See clearly

Translucent → See partly/unclearly

Opaque → Cannot see through

20. Activity – Classification by Transparency

Objects can be classified as:

Transparent

- Glass tumbler
- Clear window glass

Translucent

- Butter paper
- Frosted glass

Opaque

- Eraser
- Wooden board

21. Soluble Materials

When a material **completely dissolves in water**, it is called:

Soluble

Examples

- Sugar
- Salt

When sugar is added to water and stirred, it disappears from view because it dissolves in water.

22. Insoluble Materials

Materials that **do not dissolve in water** are called:

Insoluble

Examples

- Sand
- Sawdust
- Chalk powder

They remain visible even after stirring for a long time.

23. Activity – Solubility in Water

Take five glasses of water.

Add:

1. Sugar
2. Salt
3. Chalk powder
4. Sand
5. Sawdust

Stir each mixture.

Expected observations

Material	Solubility
Sugar	Soluble
Salt	Soluble
Chalk powder	Insoluble
Sand	Insoluble

Material	Solubility
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Sawdust	Insoluble
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Conclusion

Not every material dissolves in water.

24. Solubility of Liquids

Some liquids mix completely with water.

Other liquids do not mix with water and may form a separate layer.

Examples to investigate:

- Oil
- Vinegar
- Honey

Their behaviour depends on their properties.

25. Solubility of Gases

Some gases can dissolve in water.

Example

Oxygen dissolves in water.

This is extremely important because aquatic plants and animals need dissolved oxygen for survival.

26. ORS and Solubility

ORS means:

Oral Rehydration Solution

ORS is used to help treat dehydration caused by conditions such as diarrhoea.

The chapter explains that a ready-made ORS packet is dissolved in water.

If unavailable, the chapter describes preparing ORS at home using:

- Six teaspoons of sugar
- Half a teaspoon of common salt
- One litre of boiled and cooled water

27. How Heavy or Light?

Different objects may feel:

- Heavy
- Light

We can measure this property using **mass**.

Mass

Mass is a measure of the amount of matter present in an object.

An object with more mass is generally described as heavier than one with less mass.

28. Activity – Comparing Mass

Take three identical cups.

Fill them with:

- Water
- Sand
- Pebbles

Weigh each cup using a balance.

Record the readings.

Conclusion

The measurements allow us to compare the mass of the materials.

The heavier material has greater mass and the lighter material has less mass.

29. Mass and Weight

In everyday language, people sometimes use **weight** when referring to how heavy something is.

In science, however, **mass and weight are different concepts**.

At this level, remember:

Mass tells us the amount of matter present in an object.

The detailed relationship between mass and weight is studied in higher classes.

30. Space Occupied by an Object

Imagine a school bag placed on a chair.

You cannot sit on the chair because the bag occupies the space.

This tells us that objects occupy space.

Important Idea

Matter occupies space.

31. Volume

The amount of space occupied by a substance is called:

Volume

For example:

If one bottle contains 500 mL of water and another contains 1 L, the second bottle contains a greater volume of water.

32. Units of Volume

Common units used for volume are:

- **Litre (L)**
- **Millilitre (mL)**

The SI unit of volume is:

Cubic metre (m³)

Important conversion:

$$1 \text{ m}^3 = 1000 \text{ L}$$

33. Examples of Volume

You may see labels such as:

- 1 L
- 500 mL
- 200 mL

on:

- Water bottles
- Milk packets

- Juice containers
- Other liquid containers

These values indicate the **volume of the liquid**.

34. What is Matter?

We have learned two important properties:

1. Matter has **mass**.
2. Matter **occupies space**.

Therefore:

Definition of Matter

Anything that occupies space and has mass is called matter.

Examples:

- Water
 - Air
 - Sand
 - Pebbles
 - Wood
 - Plastic
 - Metal
 - Glass
-

35. Is Air Matter?

Yes.

Air:

- Has mass.
- Occupies space.

Therefore, air is matter.

Although we cannot normally see air, it still has physical properties.

36. Materials and Matter

Matter

Anything that occupies space and has mass.

Material

A substance used to make an object.

For example:

Plastic is a material.

A **plastic bottle** is an object made from that material.

37. Mass and Volume – Important Difference

Mass

Amount of matter in an object

Measured in g or kg

Measured using a balance

Indicates how much matter is present

Volume

Space occupied by an object

Measured in L, mL or m³

Measured using suitable volume-measuring methods

Indicates how much space is occupied

38. SI Units

Mass

SI unit:

kilogram (kg)

Volume

SI unit:

cubic metre (m³)

Common volume units:

- L
 - mL
-

39. Correct Way of Writing Units

Mass

Correct:

7 kg

Incorrect:

7 kgs

There is a space between the number and the unit.

Volume

Correct:

500 mL

Not:

500mL

Cubic metre

Correct:

2 m³

There is a space between the number and the unit.

40. Ancient Indian Classification of Properties

The chapter also introduces an interesting historical connection with **Ayurveda**.

Ancient Indian knowledge systems used properties to describe physical matter.

The *Ashtanga Hridaya* describes **20 properties (gunas)** arranged in ten pairs of opposites.

Ten Pairs

Property	Opposite
Heavy	Light
Slow	Fast
Cold	Hot
Oily/unctuous	Dry
Smooth	Rough
Solid/dense	Liquid
Soft	Hard
Stable	Moving/unstable

Property	Opposite
Small/subtle	Big/gross
Non-slimy	Slimy

These properties were used to describe matter, living systems, environment and food.

41. Traditional Knowledge and Science

The chapter shows that classification and observation of materials have a long history.

Ancient Indian traditions also developed systems for describing and grouping objects based on their properties.

This demonstrates the importance of:

- Observation
 - Classification
 - Comparison
 - Understanding properties
-

42. Historical Note – Pottery in the Indian Subcontinent

The chapter describes the long history of pottery in the Indian subcontinent.

Early pottery has been found dating back thousands of years.

Later, pottery-making techniques became more advanced, including:

- Wheel-made pottery
- Colour decoration
- Protective coatings
- Painted designs
- Carefully prepared clay
- Kiln firing

Baked clay is called:

Terracotta

Pottery was used for:

- Cooking
- Storage

- Keeping grains
 - Storing oil
 - Storing ghee
-

43. Materials and Their Uses

The properties of a material determine its uses.

Material Property		Possible Use
Glass	Transparent	Window
Steel	Hard and strong	Utensils
Plastic	Lightweight, useful for containers	Bottles
Wood	Hard and opaque	Furniture
Rubber	Flexible	Erasers
Copper	Lustrous and conducts electricity	Electrical wires
Paper	Lightweight and flexible	Books
Clay	Can be shaped before firing	Pots

44. Why Different Materials Are Used for Different Objects

A material is selected according to its properties.

For example:

Window

Glass is useful because it is **transparent**.

Chair

Wood or metal may be useful because they are **strong and hard**.

Water Bottle

Plastic or glass may be suitable because they can **hold liquids**.

Cooking Utensil

Metal may be suitable because it is **strong and durable**.

Therefore:

The properties of a material determine its suitability for a particular use.

45. Important Differences

Transparent vs Translucent vs Opaque

Transparent	Translucent	Opaque
Clear view	Unclear view	No view
Allows light through	Allows some light through	Blocks light
Clear glass	Frosted glass	Wood

Soluble vs Insoluble

Soluble	Insoluble
Dissolves in water	Does not dissolve in water
Sugar	Sand
Salt	Sawdust
Disappears after dissolving	Remains visible

Lustrous vs Non-Lustrous

Lustrous	Non-Lustrous
Shiny surface	Dull surface
Many metals	Wood
Copper	Paper
Aluminium	Rubber
Gold	Jute

Hard vs Soft

Hard	Soft
Difficult to compress	Easily compressed

Hard	Soft
Difficult to scratch	Easier to scratch
Stone	Sponge
Iron	Some rubber objects

46. Important Definitions

Material

A substance used to make an object.

Classification

The process of arranging objects into groups according to common properties.

Lustrous

Having a shiny surface.

Non-lustrous

Having a dull or non-shiny surface.

Hard

A material that is difficult to compress or scratch.

Soft

A material that can be compressed or scratched relatively easily.

Transparent

A material through which objects can be seen clearly.

Translucent

A material through which objects can be seen, but not clearly.

Opaque

A material through which objects cannot be seen.

Soluble

A material that dissolves in water.

Insoluble

A material that does not dissolve in water.

Mass

The quantity of matter present in an object.

Volume

The space occupied by matter.

Matter

Anything that has mass and occupies space.

47. Important Questions and Answers

Q1. What is a material?

Answer: A material is a substance used to make an object.

Q2. What is classification?

Answer: Classification is the process of arranging objects or materials into groups based on their common properties.

Q3. Why do we classify materials?

Answer: Classification helps us organise, study and compare materials based on their similarities and differences.

Q4. What are lustrous materials?

Answer: Materials having shiny surfaces are called lustrous materials. Metals such as iron, copper and aluminium are commonly lustrous.

Q5. What are non-lustrous materials?

Answer: Materials that do not have shiny surfaces are called non-lustrous materials. Examples include wood, paper and rubber.

Q6. Are all lustrous materials metals?

Answer: No. Some non-metallic materials can also appear shiny because their surfaces may be polished or coated.

Q7. What is a hard material?

Answer: A material that is difficult to compress or scratch is called hard.

Q8. What is a soft material?

Answer: A material that can be compressed or scratched relatively easily is called soft.

Q9. What are transparent materials?

Answer: Materials through which objects can be seen clearly are called transparent materials.

Q10. What are translucent materials?

Answer: Materials through which objects can be seen but not clearly are called translucent materials.

Q11. What are opaque materials?

Answer: Materials through which objects cannot be seen are called opaque materials.

Q12. What is solubility?

Answer: Solubility refers to the ability of a material to dissolve in a particular substance such as water.

Q13. What are soluble materials?

Answer: Materials that completely dissolve in water are called soluble materials. Sugar and salt are examples.

Q14. What are insoluble materials?

Answer: Materials that do not dissolve in water are called insoluble materials. Sand and sawdust are examples.

Q15. What is mass?

Answer: Mass is a measure of the amount of matter present in an object.

Q16. What is volume?

Answer: Volume is the amount of space occupied by a substance.

Q17. What is matter?

Answer: Anything that occupies space and has mass is called matter.

Q18. Is air matter?

Answer: Yes. Air is matter because it has mass and occupies space.

48. Important Exercise Answers**Q1. Unscramble and Match**

(i) T R E M A T

MATTER

→ Occupies space and has mass.

(ii) U L S B E L O

SOLUBLE

→ Mixes completely in water.

(iii) T N E R P A S N A R T

TRANSPARENT

→ Objects can be seen clearly through it.

(iv) E R U S T L

LUSTRE

→ Shiny surface.

The exercise in the uploaded chapter asks students to make these connections.

49. Exercise: Transparent Containers**Question**

Why are containers used to store materials in shops and homes often transparent?

Answer

Transparent containers allow us to see the material stored inside without opening the container. This makes it easier to identify the contents.

50. Exercise: True or False

(i) Wood is translucent while glass is opaque.

✗ False

Correct statement:

Wood is opaque and clear glass is transparent.

(ii) Aluminium foil has lustre while an eraser does not.

✓ True

(iii) Sugar dissolves in water whereas sawdust does not.

✓ True

(iv) An apple is matter because it occupies no space and has mass.

✗ False

Correct statement:

An apple is matter because it occupies space and has mass.

51. Air and Wooden Door

Question

Air is all around us, but we can see through it. A wooden door prevents us from seeing through it. Why?

Answer

Air is **transparent**, while a wooden door is **opaque**.

Correct option:

(i) Transparent, opaque

52. Mystery Materials X and Y

Suppose:

- X is rigid.
- Y changes shape easily.
- X dissolves in water.
- Y does not dissolve.

X

X is likely:

- Hard
- Soluble

A possible example is **sugar**, although sugar is not rigid in every sense.

Y

Y is likely:

- Soft
- Insoluble

A possible example is **sawdust**, depending on the described behaviour.

Main reasoning

The properties tell us:

Rigid → hard

Changes shape easily → soft

Dissolves → soluble

Does not dissolve → insoluble

53. "Who Am I?" Answers

(a) I have lustre.

Answer: Metal

(b) I can be easily compressed.

Answer: Soft material

(c) I am hard and soluble in water.

Answer: A suitable example would be a hard soluble substance such as a crystalline salt.

(d) You cannot see clearly through me.

Answer: Translucent material

(e) I have mass and volume but you cannot see me.

Answer: Air

These answers are based on the properties specified in the exercise.

54. Waste Containers – Suitable Materials

Different waste materials require containers with suitable properties.

Food Waste

A suitable container should be:

- Strong
- Easy to clean
- Preferably washable
- Suitable for holding wet waste

Broken Glass

The container should be:

- Strong
- Rigid
- Resistant to sharp objects

Wastepaper

The container can be:

- Lightweight
- Easy to handle
- Strong enough for paper

The choice of material should depend on the properties required for each type of waste.

55. Important MCQs

1. Which of the following is a material?

- A. Chair
- B. Plastic
- C. Table
- D. Bottle

Answer: B. Plastic

2. Which property describes a shiny surface?

- A. Hardness
- B. Lustre
- C. Solubility
- D. Volume

Answer: B. Lustre

3. Which material is transparent?

- A. Wood
- B. Cardboard
- C. Clear glass
- D. Iron

Answer: C. Clear glass

4. Which material is opaque?

- A. Air
- B. Water
- C. Clear glass
- D. Wood

Answer: D. Wood

5. Which is translucent?

- A. Frosted glass
- B. Iron
- C. Wood
- D. Clear water

Answer: A. Frosted glass

6. Which substance dissolves in water?

- A. Sand
- B. Sawdust
- C. Sugar
- D. Chalk powder

Answer: C. Sugar

7. Which is insoluble in water?

- A. Salt
- B. Sugar

- C. Sand
- D. Glucose

Answer: C. Sand

8. The amount of matter in an object is called:

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

Answer: B. Mass

9. The space occupied by matter is called:

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

Answer: C. Volume

10. Anything that has mass and occupies space is:

- A. Material
- B. Matter
- C. Energy
- D. Light

Answer: B. Matter

11. The SI unit of mass is:

- A. gram
- B. kilogram
- C. litre
- D. millilitre

Answer: B. kilogram

12. The SI unit of volume is:

- A. litre
- B. millilitre
- C. cubic metre
- D. kilogram

Answer: C. cubic metre

56. Fill in the Blanks

1. A substance used to make an object is called a **material**.
 2. The process of grouping objects based on common properties is called **classification**.
 3. Shiny materials are called **lustrous** materials.
 4. Materials that do not dissolve in water are called **insoluble**.
 5. Materials through which objects can be seen clearly are called **transparent**.
 6. Materials through which objects cannot be seen are called **opaque**.
 7. Materials through which objects can be seen unclearly are called **translucent**.
 8. The amount of matter in an object is called **mass**.
 9. The space occupied by matter is called **volume**.
 10. Anything that occupies space and has mass is called **matter**.
-

57. True or False

1. All materials have exactly the same properties.
False
2. Objects can be classified based on their properties.
True
3. All shiny objects are metals.
False
4. Clear glass is transparent.
True
5. Wood is generally opaque.
True
6. Sugar is soluble in water.
True
7. Sand is soluble in water.
False

8. Matter has mass and occupies space.

True

9. Air is not matter because we cannot see it.

False

10. The SI unit of mass is kilogram.

True

58. Quick Revision Table

Property	Meaning	Examples
Lustrous	Shiny	Gold, copper
Non-lustrous	Dull	Wood, paper
Hard	Difficult to compress/scratch	Iron, stone
Soft	Easily compressed/scratched	Sponge
Transparent	See clearly through it	Clear glass
Translucent	See unclearly through it	Frosted glass
Opaque	Cannot see through it	Wood
Soluble	Dissolves in water	Sugar, salt
Insoluble	Does not dissolve in water	Sand, sawdust
Mass	Amount of matter	Measured in kg
Volume	Space occupied	Measured in L/mL/m ³

59. Chapter Summary ★

The chapter teaches us that:

- Objects are made from different materials.
- A single object may contain more than one material.
- Materials can be classified according to their properties.
- The choice of material depends on its properties and the purpose of the object.
- Materials may be lustrous or non-lustrous.
- Materials may be hard or soft.

- Materials may be transparent, translucent or opaque.
 - Some materials are soluble in water, while others are insoluble.
 - Materials have mass and occupy space.
 - The amount of matter is measured by mass.
 - The space occupied by matter is its volume.
 - Anything that has mass and occupies space is called matter.
 - Air is also matter.
 - The SI unit of mass is kilogram.
 - The SI unit of volume is cubic metre.
 - Common units of volume include litre and millilitre.
-

60. ★ MOST IMPORTANT POINTS FOR EXAM

Remember these points:

Materials

Material → substance used to make an object

Classification

Classification → grouping according to common properties

Lustre

Shiny → Lustrous

Dull → Non-lustrous

Hardness

Difficult to compress/scratch → Hard

Easy to compress/scratch → Soft

Visibility

See clearly → Transparent

See unclearly → Translucent

Cannot see → Opaque

Solubility

Dissolves → Soluble

Does not dissolve → Insoluble

Matter

Mass + Occupies space → Matter

Mass

Amount of matter → Mass

SI unit → kg

Volume

Space occupied → Volume

Common units → L, mL

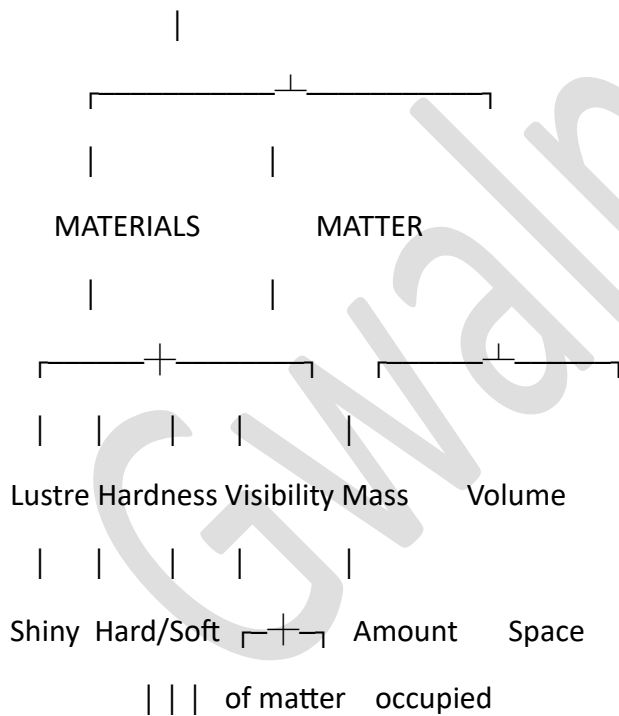
SI unit → m³

Important conversion

$$1 \text{ m}^3 = 1000 \text{ L}$$

61. One-Minute Revision

MATERIALS AROUND US



Transparent

Translucent

Opaque

SOLUBILITY

└───┬───┘	
Soluble	Insoluble
Sugar	Sand
Salt	Sawdust

SI UNITS

Mass → kg

Volume → m³

COMMON VOLUME UNITS

L, mL

1 m³ = 1000 L