

## Chapter – 2

### Sorting Materials into Groups

2marks:

**1. Name five objects which can be made from wood.**

**Answer:**

- a) Table
- b) Chair
- c) Doors
- d) Desk
- e) Box

**2. Select those objects which shine from the following:**

**Glass bowl, plastic toy, steel spoon, cotton shirt**

**Answer:**

Glass bowl and steel spoon are the objects which shine.

**3. Why is it important to group objects based on their materials?**

**Answer:**

Grouping objects based on materials helps in organizing and locating them easily for convenience in daily life.

**4. Name two materials that are commonly used to make everyday objects.**

**Answer:**

Common materials used for everyday objects include plastic and metal.

**5.What property of materials is observed when some substances dissolve in water?**

**Answer:**

Solubility is the property of materials observed when substances dissolve in water.

**6.Differentiate between transparent and opaque materials.**

**Answer:**

Transparent materials allow the passage of light, making objects visible through them, while opaque materials block the passage of light.

**7.Why do we observe lustre on the freshly cut surface of some metals?**

**Answer:**

Lustre on the freshly cut surface of metals, like iron and copper, is due to their inherent shiny or reflective properties.

**8.Explain the significance of grouping materials based on similarities and differences in properties.**

**Answer:**

Grouping materials helps in studying their properties systematically, identifying patterns, and understanding their diverse characteristics.

**9.Provide an example of a translucent material.**

**Answer:**

An oily patch on paper, as observed during the testing of food items for fats, is an example of a translucent material.

**5marks:****1. Discuss the Significance of Grouping Materials in Various Industries.****Answer:**

Grouping materials is paramount across various industries for organizational efficiency and specific applications. In manufacturing, materials are grouped based on their properties, facilitating streamlined production processes. For instance, in the automotive industry, metals with specific strength and durability characteristics are grouped for constructing different components. In the pharmaceutical sector, grouping materials based on solubility and chemical properties is crucial for drug formulation. Moreover, grouping aids in waste management, allowing industries to categorize materials for recycling or proper disposal.

**2. Explain the Role of Transparency in Everyday Objects and Its Impact on Design.****Answer:**

Transparency is a vital property influencing the design of everyday objects. Materials like glass and certain plastics are preferred for windows and containers due to their transparency, allowing the passage of light. This property is exploited in designing eyeglasses, camera lenses, and smartphone screens. In architecture, transparent materials are used to create open and well-lit spaces. The impact of

transparency on design extends beyond aesthetics to functionality, influencing the user experience and the overall visual appeal of products.

### **3. Elaborate on the Environmental Implications of Material Properties and Recycling.**

#### **Answer:**

Understanding the properties of materials is crucial for environmental sustainability. Some materials, like plastics, may take centuries to decompose, contributing to environmental pollution. Recycling plays a pivotal role in mitigating these concerns. By grouping materials based on recyclability, industries and individuals can actively contribute to reducing waste. Innovations in sustainable materials, such as biodegradable plastics and eco-friendly packaging, showcase the importance of grouping materials for environmental conservation.

### **4. Discuss the Role of Buoyancy in Designing Floating Objects. Provide Examples.**

#### **Answer:**

Buoyancy, determined by the density of materials, plays a significant role in designing floating objects. Materials with lower density than water float, and this principle is harnessed in various applications. For instance, life jackets are designed with materials like foam that provide buoyancy, ensuring the wearer stays afloat in water. Similarly, boats and ships are constructed using materials like wood and metals,

taking into account their buoyancy to prevent sinking. Understanding the buoyant properties of materials is critical for marine engineering and water-related designs.

**5. Explore the Influence of Water on Material Properties. Provide Examples.**

**Answer:**

Water exerts a profound influence on the properties of various materials. Metals, when exposed to air and moisture, may lose their lustre due to oxidation. For example, iron develops rust when it reacts with water and oxygen. Water's solubility power is evident in everyday objects; salt dissolves in water, while oil forms a separate layer. Additionally, water plays a role in the buoyancy of objects, affecting whether they float or sink. Understanding the interaction between materials and water is essential for maintaining the integrity and functionality of objects in different environments.

**6. Examine the Relationship Between Material Properties and their Applications in Household Items.**

**Answer:**

Material properties heavily influence the selection of materials for household items. For instance, kitchen utensils like spoons and pans are often made of metals such as stainless steel, known for their hardness and resistance to corrosion. Transparent materials like glass are used for windows and containers in homes to allow light and

visibility. Fabrics made of cotton or synthetic materials are chosen for clothing and upholstery based on their texture, comfort, and durability. The careful consideration of material properties ensures the suitability of materials for their intended applications in everyday household items.

**7. Investigate the Role of Materials in Sustainable Design and Innovations. Provide Examples.**

**Answer:**

Sustainable design involves using materials that minimize environmental impact. Materials science innovations contribute to this goal. For instance, the development of biodegradable plastics aims to reduce plastic pollution. Smart materials with energy-efficient properties, like self-healing polymers, are utilized in infrastructure for prolonged durability. Innovations in lightweight materials contribute to fuel efficiency in transportation. Sustainable architecture often incorporates recycled materials, showcasing the importance of grouping materials based on eco-friendly criteria. These examples demonstrate how materials play a crucial role in advancing sustainability in design and technology.

**8. Discuss the Role of Material Properties in Medical Applications. Provide Examples.****Answer:**

Material properties are pivotal in medical applications, influencing the design and effectiveness of various devices. Biocompatible materials, such as titanium, are used in implants to ensure compatibility with the human body. Polymers with specific solubility properties are employed in drug delivery systems for controlled release. Materials with antibacterial properties are utilized in medical equipment and surfaces to maintain hygiene. The understanding of material properties is crucial for ensuring the safety and efficacy of medical devices and implants, showcasing the interdisciplinary nature of materials science in healthcare.

**9. Evaluate the Relationship Between Material Properties and Artistic Creations. Provide Examples.****Answer:**

Material properties play a significant role in artistic creations, influencing both aesthetics and structural integrity. Artists often choose materials based on their visual and tactile properties. For instance, sculptors may prefer materials like marble or bronze for their durability and ability to hold intricate details. Painters select canvases and pigments based on their texture and colour vibrancy. The translucency of materials like stained glass enhances the visual



appeal in architectural art. The relationship between material properties and artistic creations highlights the versatility and expressive potential of different materials in the realm of art and design.

**3. Match the objects given below with the materials from which they could be made. Remember, an object could be made from more than one material, and a given material could be used for making many objects.**

Objects	Material
Book	Glass
Tumbler	Wood
Chair	Paper
Toy	Leather
Shoes	Plastics

**Answer:**

<b>Objects</b>	<b>Material</b>
Book	Paper, wood
Tumbler	Glass, wood, plastic
Chair	wood, plastic
Toy	Glass, wood, paper, plastics, leather
Shoes	Leather, plastic

**4. State whether the statements given below are True or False.**

- (i) Stone is transparent, while glass is opaque.**
- (ii) A notebook has lustre while an eraser does not.**
- (iii) Chalk dissolves in water.**
- (iv) A piece of wood floats on water.**
- (v) Sugar does not dissolve in water.**
- (vi) Oil mixes with water.**
- (vii) Sand settles down in the water.**

**(viii) Vinegar dissolves in water.**

**Answer:**

i) False

ii) False

iii) False

iv) True

v) False

vi) False

vii) True

viii) True

**5. Given below are the names of some objects and materials:**

**Water, basketball, orange, sugar, globe, apple and earthen pitcher. Group them as:**

**(a) Round shaped and other shapes (b) Eatables and non-eatables**

**Solution:**

(a) Round shaped – Basketball, Orange, Globe, Apple, Earthen Pitcher

Other shapes – Water, Sugar

(b) Eatables – Water, Orange, Sugar, Apple

Non-eatables – Basketball, Globe, Earthen Pitcher

**6. List all items known to you that float on water. Check and see if they will float on an oil or kerosene.**

**Solution:**

A few items that float on water are as follows:

1. Sponge's piece
2. Plastic bottle
3. Paper's piece
4. Thermocool's piece
5. Wood
6. Plastic ball
7. Cork

However, these items will not float on oil or kerosene.

**7. Find the odd one out from the following:**

**a) Chair, Bed, Table, Baby, Cupboard**

**b) Rose, Jasmine, Boat, Marigold, Lotus**

**c) Aluminium, Iron, Copper, Silver, Sand**

**d) Sugar, Salt, Sand, Copper Sulphate**

**Solution:**

- a) Baby – others are made up of wood
- b) Boat – others are flowers
- c) Sand – others are metals
- d) Sand – others are soluble in water

**Fill in the blanks:**

- 1. Materials that have \_\_\_\_\_ are usually metals, such as iron, copper, aluminium, and gold.**
- 2. When you press materials with your hands, some may be hard to compress while others can be easily \_\_\_\_\_.**
- 3. Soluble substances \_\_\_\_\_ in water, while insoluble substances do not mix and may settle down.**
- 4. Transparency is a property that allows materials like \_\_\_\_\_ and certain plastics to let light pass through.**
- 5. Buoyancy is determined by the \_\_\_\_\_ of materials, affecting whether objects float or sink in water.**
- 6. In sustainable design, materials with low environmental impact, such as \_\_\_\_\_ plastics, are preferred.**
- 7. Materials with antibacterial properties are crucial in maintaining \_\_\_\_\_ in medical applications.**
- 8. Artists often choose materials for their artistic creations based on both visual and \_\_\_\_\_ properties.**
- 9. Transparent materials, like glass, are used in architecture to create open and well-lit \_\_\_\_\_.**
- 10. Smart materials with energy-efficient properties, like self-healing polymers, contribute to \_\_\_\_\_ in infrastructure.**

**Answers:**

1.lustre

2.compressed

3.dissolve

4.glass

5.density

6.biodegradable

7.hygiene

8.tactile

9.spaces

10.sustainability

**Multiple choice:**

**1.What is the primary purpose of grouping materials?**

**A) Aesthetic appeal**

**B) Convenience and study of properties**

**C) Random arrangement**

**D) Cost reduction**

**Answer:** B) Convenience and study of properties

**2.Which of the following materials is typically transparent?**

- A) Wood**
- B) Metal**
- C) Glass**
- D) Stone**

**Answer:** C) Glass

**3.When a material can be easily scratched, it is considered:**

- A) Hard**
- B) Soft**
- C) Transparent**
- D) Opaque**

**Answer:** B) Soft

**4.Which property helps us distinguish between soluble and insoluble substances?**

- A) Lustre**
- B) Hardness**
- C) Solubility**
- D) Density**

**Answer:** C) Solubility

**5. Objects that float or sink in water are influenced by their:**

- A) Colour**
- B) Density**
- C) Transparency**
- D) Hardness**

**Answer:** B) Density

**6. What is the term for materials that allow light to pass through but not clearly?**

- A) Transparent**
- B) Opaque**
- C) Translucent**
- D) Soluble**

**Answer:** C) Translucent

**7. Which property is crucial for maintaining cleanliness in medical applications?**

- A) Lustre**
- B) Transparency**
- C) Hygiene**
- D) Solubility**

**Answer:** C) Hygiene



**8.What plays an important role in the functioning of our body due to its ability to dissolve many substances?**

- A) Air**
- B) Water**
- C) Wood**
- D) Metal**

**Answer: B) Water**

**9.In sustainable design, what type of plastics are preferred for their low environmental impact?**

- A) Non-biodegradable**
- B) Transparent**
- C) Biodegradable**
- D) Opaque**

**Answer: C) Biodegradable**

**10.Which property helps distinguish between materials that can be easily compressed and those that are difficult to compress?**

- A) Solubility**
- B) Hardness**

**C) Transparency**

**D) Density**

**Answer: B) Hardness**

### Summary:

The provided text discusses the diverse properties and classifications of materials in our surroundings. It emphasizes the various ways materials can be grouped, such as based on shape, material composition, and usage. Objects are made from a wide array of materials, including glass, metal, plastics, wood, cotton, paper, mud, or soil.

The text introduces activities to explore material properties, such as testing for lustre, hardness, solubility, and transparency. It highlights the significance of these properties in selecting materials for specific purposes. For instance, materials with lustre are usually metals, and hardness varies among materials like cotton (soft) and iron (hard). Solubility is demonstrated through substances dissolving or not in water, and transparency is illustrated by materials that are opaque, transparent, or translucent.

In conclusion, the text provides a foundational understanding of the properties of materials and the rationale behind grouping them, laying the groundwork for further exploration of material science.