Properties of Materials

A. Fill in the Blanks

Complete the sentences with the correct term from the word bank.

1. The ability of a material to resist scratching is called _____.

2. Materials that do not allow heat to pass through them easily are known as thermal _____.

3. The rusting of an iron gate is a slow chemical reaction with oxygen, also known as _____.

4. A material that can be hammered or pressed into thin sheets is said to be _____.

5. Materials that do not allow any light to pass through are called _____.

B. Match the Following;

Match the term or symbol in Column A with its correct description or unit in Column B.

Column A	Column B
1. Lustre	A. The ability to be stretched and return to the original shape.
2. Conductivity	B. The tendency to shatter or break easily when struck.
3. Brittleness	C. The shininess or ability to reflect light.
4. Elasticity	D. The ability to be drawn into a thin wire.
5. Ductility	E. The ability to allow heat or electricity to flow through.

C. Practice Problems

Apply your knowledge to answer the following questions. Provide brief explanations where required.

1. Why are the handles of cooking pots often made of plastic or wood, while the pot itself is made of metal?

2. List three physical properties of gold that make it a good material for making jewelry. a. _____b. _____c. _____

3. Explain the difference between strength and hardness.

4. An object is dropped into a beaker of water and it sinks to the bottom. What can you conclude about its density compared to water?

5. What is the key property of rubber that allows it to be used for a rubber band?

6. Why are diamonds, one of the hardest known substances, used on the tips of cutting tools?

7. Differentiate between a physical change and a chemical change using the example of an iron nail.

8. Name a material that is both strong and malleable.

9. Why is a material like styrofoam a good choice for a disposable coffee cup? (Hint: Think about heat).

10. What property allows a blacksmith to hammer a hot piece of iron into a shape like a horseshoe?

D. Warm-up Questions

Answer these quick questions to get your brain warmed up!

1. What property describes a material's shininess or reflectiveness?

2. Name one material that is a good conductor of electricity.

3. Is the ability of wood to burn a physical or a chemical property?

4. What does it mean if a material is 'brittle'?

5. Which property allows a metal like copper to be drawn into a long, thin wire?

E. Challenge Questions

Think critically to solve these challenging problems.

1. You are an engineer designing a new type of body armor for a firefighter. List and explain three essential properties the material for the outer layer must have.

a. Property: _____ Explanation: _____

b. Property: _____ Explanation: _____

c. Property: _____ Explanation: _____

2. A scientist discovers a new element. It is shiny, very dense, and conducts electricity well. However, when struck with a hammer, it shatters into many pieces. Is this element likely a typical metal? Explain your reasoning.

3. Explain how the shape of an object made from a dense material (like steel) can allow it to float on water.

4. A bridge is built with steel beams. Discuss one physical property that is crucial for this application and one chemical property that is a major disadvantage. Crucial Physical Property: _____ Disadvantageous Chemical Property: _

5. You are given three solid, unlabeled cubes of the same size: one is aluminum, one is lead, and one is wood. How could you use the property of density to identify each one without any special equipment other than a bucket of water and your hands?

F. Word Problems & Application

Read the scenarios and identify the important material properties.

1. An architect is designing a large concert hall. She chooses to use soft, fabric-covered panels on the walls. What property of this material is she using to prevent echoes?

2. A company manufactures smartphones. They need a material for the screen that is hard (to resist scratches) and also lets light pass through it. What two properties are they looking for? _____ and _____

3. To make a car more fuel-efficient, engineers want to build its body from a material that is very strong but also has low density. Why is low density important here?

4. A sculptor has a block of marble. He can chip away at it to create a statue. Does marble have high or low brittleness?

5. Why is helium, a gas that is less dense than air, used in party balloons, while the balloon itself is made of an elastic material like latex?

G. True or False

1. All metals are magnetic. _____
2. Glass is a very elastic material. _____
3. Dissolving salt in water is an example of a chemical change. _____
4. Strength is the property that allows a material to be drawn into a wire. _____
5. Copper is used for electrical wiring because it is a good electrical insulator. _____