

## Chemistry Quiz 1 Review

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1. A pure substance is made up of one type of element or compound, while a mixture contains two or more pure substances that are not chemically combined. Examples of pure substances are potassium (or another element) and water (or another compound). Students may give any solution, suspension, or mechanical mixture as an example of a mixture; examples include salt water, salad dressing, and a needle in a haystack.

2. A chemical change is a process, or change in matter, that results in the formation of a new substance or substances.

3. (a) solid  $\rightarrow$  gas = sublimation

(b) solid  $\rightarrow$  liquid = melting

(c) liquid  $\rightarrow$  gas = evaporation

(d) liquid  $\rightarrow$  solid = freezing (or solidification)

(e) gas  $\rightarrow$  liquid = condensation

(f) gas  $\rightarrow$  solid = deposition (sometimes called sublimation)

4. The ability to stretch without breaking is a useful property for disposable shopping bags, as many items with a lot of mass can be carried in such bags without their breaking.

5. Cohesion refers to the attraction between particles of the same substance, which makes them stick together. Adhesion refers to the attraction between different particles. Students' examples may vary but could include the following: Cohesion is visible when you spill some milk (or water); the milk will tend to form a puddle rather than separating into drops. Adhesion is apparent when honey will stick to the sides of an empty container, or when water clings to the sides of a cylinder, forming a meniscus.

6. Particles of water in the air can form frost on a cold window because the window absorbs heat from the water in the air. Then, as the water cools, the particles in the water slow down and move closer together, so that the water either undergoes deposition (changes from a gas to a solid) or it first condenses (changes from a gas to a liquid) and then freezes (changes from liquid to solid).

7.

(a) Gold, copper, and iron are all solid metals at room temperature.

(b) Gold and copper are soft and malleable, whereas iron is hard.

(c) Diamond and glass are clear solids at room temperature.

(d) Diamond is extremely hard, whereas glass is not.

8. Cooling a hot substance may result in a change of state (from gas to liquid, liquid to solid, or gas to solid) or a change in volume (water expands when it freezes; a gas contracts to form a liquid).

**9. (a)** Lustre is a physical property, as it is an observable property.  
**(b)** A precipitate appearing is a chemical property, as it indicates how one substance reacts to another.  
**(c)** State is a physical property, as it is an observable property.

**10. (a)** Leaves changing colour suggests a chemical change, as a new substance is formed.  
**(b)** A precipitate forming suggests a chemical change, as a new substance is formed.  
**(c)** Water boiling is a physical change, as it is simply a change of state.

**11.** Water forms droplets on a smooth surface, such as a countertop, due to lack of adhesion between the water and the surface and cohesion of the water to itself; particles in the water attract one another and stick together.

**12.** The following are examples of different types of mixtures with different arrangements of parts.  
**(a)** A drink made by dissolving drink crystals in water is a solution (homogeneous mixture).  
**(b)** A cup of tea with leaves in it is a mechanical mixture (heterogeneous mixture).  
**(c)** Tomato juice is a suspension (heterogeneous mixture).

**13.** Many substances will undergo a chemical reaction if heated. Examples may vary but could include paper, which will burn with sufficient heating, and baking powder, which releases carbon dioxide gas when heated.

**14.** The more air in the metal foam, the less dense it is. That is, there is less mass because there is more air in the same space compared to a piece of solid metal of similar size.

**15.** The pipes may burst if water freezes, because water expands when it freezes. Ice is less dense than water, which means that ice with the same mass as liquid water takes up more space. If the pipes are filled with water and the water freezes, it expands, bursting the pipes.

**16.** Three properties of plastic that make it suitable for use in eyeglass lenses are that it is clear, lightweight, and durable (less likely to break or shatter than glass lenses).