



# ST. LAWRENCE HIGH SCHOOL



A JESUIT CHRISTIAN MINORITY INSTITUTION

**Sub: Physical Science**

**Class: 8**

**Date: 04.05.20**

## **STUDY MATERIAL: CHAPTER 2 PHYSICAL AND CHEMICAL CHANGES (CHEMISTRY)**

### ***Concepts***

1. Define Reversible change.  
A: A change is said to be reversible when the opposite change can be brought about by reversing the conditions.
2. Define irreversible change.  
A: A change is said to be irreversible when the opposite change cannot be brought about by reversing the conditions.
3. Define Periodic change.  
A: Periodic changes are those which take place at fixed intervals of time.
4. Define Non-periodic changes.  
A: Non periodic changes are those which do not take place at fixed intervals of time.
5. Define desirable change.  
A: The changes that are useful to us are called desirable changes.
6. Define undesirable change.  
A: The changes that are harmful are called undesirable changes.
7. Define Physical change.  
A: A change in which no new substance is formed and which can be reversed by reversing the conditions is called a physical change.
8. Define Chemical change.  
A: A change in which new substances are formed and which cannot be reversed by reversing the conditions is called a chemical change.
9. Define exothermic change.  
A: A change during which heat is given out is called exothermic change.
10. Define endothermic change.  
A: A change in which heat is taken in is called an endothermic change.
11. Give the full form of LPG and CNG.  
A: LPG: Liquefied Petroleum Gas and CNG: Compressed Natural Gas.
12. Define solute.  
A: The substance that dissolves in a solvent to form a solution is called the solute.
13. Define solvent.  
A: The substance in which the solute dissolves is called the solvent.
14. What is a solution?  
A: The mixture obtained when a solute dissolves in a solvent is called a solution.
15. Define charring of sugar.  
A: When sugar, which is a carbohydrate containing carbon and elements of water, is heated, water gets loosed and vaporized; leaving a black residue of carbon, the process is called charring of sugar.
16. What is curdling of milk?  
A: When few drops of lemon juice are added to milk and then the mixture is boiled a thick white substance called curd is formed and the process is called curdling.
17. How can a solute be obtained from a solution?  
A: A solute can be obtained by a solution by evaporating the solvent.

18. What is burning?

A: Burning is a fast reaction between a combustible substance and oxygen of the air.

19. What is slaking of lime?

A: When water is added to quicklime, slaked lime is produced along with a evolution of a large amount of heat and the process is called slaking of lime.

20. What are hydrocarbons?

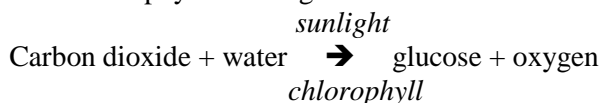
A: Kerosene, diesel, petrol, LPG and CNG are compounds of hydrogen and carbon only and they are called hydrocarbons.

21. What is fermentation?

A: Fermentation is the process whereby in the presence of enzymes a sugar solution changes to alcohol, liberating carbon dioxide.

22. What is photosynthesis?

A: Photosynthesis is the process by which green plants prepare glucose from carbon dioxide and water in the presence of chlorophyll in sunlight.



23. What is respiration?

A: Respiration is the process whereby glucose from a living being combines with the oxygen from air to form carbon dioxide and water liberating energy.



### Short Notes

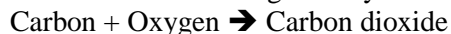
1. Differentiate between Physical and Chemical changes.

Physical Change	Chemical Change
<ul style="list-style-type: none"><li>No new substance are formed after a physical change</li><li>A physical change is temporary</li><li>A physical change is generally reversible</li><li>After a physical change the mass of the substance remains unchanged</li></ul>	<ul style="list-style-type: none"><li>New substances are formed after a chemical change</li><li>A chemical change is permanent</li><li>A chemical change is usually irreversible</li><li>The mass of the individual substance(s) undergoing a chemical change is altered.</li></ul>

2. Give two examples to show that the mass of the individual substance(s) undergoing a chemical change is altered. How do these changes obey the law of conservation of mass?

A: During a chemical change the mass of the individual substance(s) undergoing a chemical change is altered but the total mass of the reactants and products is conserved. Let us take two examples,

(a) When carbon is burnt in air the carbon gradually vanishes. The reaction is as follows:



If the mass of the oxygen and carbon are measured together it shall be equal to the mass of the carbon dioxide produced. Thus the law of conservation of mass is obeyed here.

(b) When iron is left in moist air it rusts. The mass of the nail is seen to increase. The reaction taking place is as follows:



If the mass of the original nail and that of oxygen and moisture taken from air is measured it will be found equal to the mass of the rusted nail. Thus the law of conservation of mass is obeyed here

3. Discuss an example to show that physical and chemical changes can occur together.

A: Burning of a wax candle is an example of a physical and chemical change occurring together. The melting of wax into its liquid state. The melted wax flows down and solidifies. These changes of state are physical changes occurring. However the burning wick vaporizes a part of

the molten wax to form carbon dioxide and water vapour. The burning of the wax itself is a chemical change.

4. Differentiate between Endothermic and Exothermic changes.

<b>Endothermic Change</b>	<b>Exothermic Change</b>
<ul style="list-style-type: none"><li>• Heat is absorbed</li><li>• Change continues only till energy is pumped in</li></ul>	<ul style="list-style-type: none"><li>• Heat is given out</li><li>• Once initiated these changes go to completion on their own</li><li>•</li></ul>

### *Explanation*

1. Explain how the phases of moon are a periodic change.  
A: The moon changes phase from full moon to new moon and this change takes place over a period of 28 days. The same change is repeated over the next 28 days. So the phases of moon are an example of periodic changes.
2. Explain why there is an energy change in change of state.  
A: The molecules in the different states of matter possess different Kinetic energies. The kinetic energy is lowest in solids and highest in gases. So heat is absorbed by solid to melt or a liquid to form vapour. At the same time released by vapour to condense and liquid to freeze. Thus energy changes occur during change of state of a substance.
3. Explain why there is an energy change in dissolution.  
A: During dissolution the solute particles break up from the main bulk and hide themselves in the intermolecular space of the solvent. This affects the motion and so the KE of the molecules. The KE of the particles is dependent on temperature. So a change in the KE will result in the absorption or evolution of heat.
4. Explain why there is an energy change in a chemical change.  
A: A chemical change involves a rearrangement of atoms. The reactant molecules break up and the product molecules are formed. These processes are not only opposite in nature but involve different amounts of energy too. So in the overall process there is either a surplus or a deficit of energy. If there is a surplus the excess energy is given out and the change is exothermic. If there is deficit the energy is taken in making it endothermic.

5. Classify the following changes as reversible, irreversible, periodic, non-periodic, desirable, undesirable, physical, chemical, exothermic and endothermic

Changes	Reversible	Irreversible	Periodic	Non-periodic	Desirable	Undesirable	Physical	Chemical	Exothermic	Endothermic
Charring of sugar		√		√		√		√		√
Digestion of food		√		√	√			√	√	
Rotting of egg		√		√		√		√		
Decay of carcass		√		√		√		√		
Melting	√			√			√			√
Respiration		√		√	√			√	√	
Cooking		√		√	√			√		√
Fermentation		√		√	√			√	√	
Evaporation	√			√			√			√
Sublimation	√			√			√			
Dissolution of glucose	√			√	√		√			√
Dissolution of quicklime		√		√	√			√	√	
Dissolution of concentrated hydrochloric acid in water		√		√	√		√		√	
Burning of fuel		√		√	√			√	√	
Glowing of bulb	√			√	√		√		√	
Freezing	√			√			√		√	
Curdling of milk		√		√				√		√
Photosynthesis		√		√	√			√		√
Condensation	√			√			√		√	
Reaction of nitrogen and oxygen to form nitric oxide		√		√				√		√
Reaction between iron and sulphur forming Iron (II) sulphide		√		√				√	√	
Phases of Moon	√		√		√		√			

## *Solution of Previous Years' Question Papers*

**2019**

**1<sup>st</sup> Term**

Choose the correct answer:

4. Curdling of milk is a

- a) Reversible change **b) irreversible change** c) both a and b d) none of them

Fill in the blanks

1. **Non-Periodic changes** are those which do not take place at fixed intervals of time.

3. The changes that are useful to us are called **desirable** changes

9. Photosynthesis is a **chemical** change.

Short answer questions:

1. State 3 differences between physical and chemical changes.

<b>Physical Change</b>	<b>Chemical Change</b>
1. A physical change is temporary	1. A chemical change is permanent
2. It is reversible	2. It is irreversible
3. No new substances are formed	3. New substances are formed.

### **Long Answer Questions**

1. Discuss an example to show that physical and chemical changes can occur together.

Ans: The burning of a candle is an example where the burning of the wax and the candle is a chemical change but the melting of the wax that flows down to the base of the candle and solidifies is a physical change.

3. How is burning of fuel and fermentation examples of chemical changes?

Ans: When a fuel is burnt the hydrocarbon changes to give carbon dioxide and water vapour. Thus new substances are formed and it is an irreversible change. Hence it is a chemical change.

In fermentation enzymes act on sugar solution to form alcohol, liberating carbon dioxide. Again we see that new substances are formed and it is an irreversible change. Hence it is a chemical change.

4. Explain what happens during curdling of milk?

Ans: The curdling of milk is a chemical change where on the introduction of calcium lactate or citric acid the colloid precipitates the protein which forms cottage cheese. The milk cannot be recovered. It is an irreversible change with the formation of a new substance. Hence it is a chemical change.

### ***3<sup>rd</sup> Term***

#### **Long answer questions**

6. Discuss an example to show that physical and chemical changes can occur together.

Ans: The burning of a candle is an example where the burning of the wax and the candle is a chemical change but the melting of the wax that flows down to the base of the candle and solidifies is a physical change.