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# Sanjiv Refresher

# SCIENCE

## CLASS X

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# 1

## Chemical Reactions and Equations

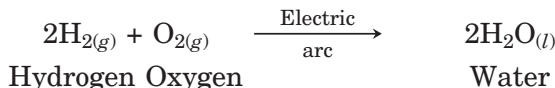
### Important Concepts

- Chemical reaction :** Chemical changes in which one or more new substances are formed with different composition and properties. A chemical reaction shows following characteristics :

The substances that take part in a reaction are called reactants and the substance formed are called products.

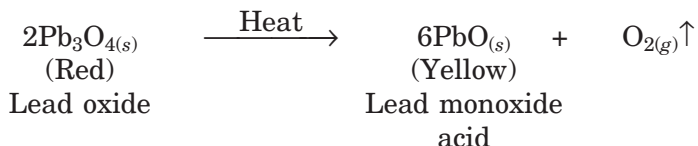
- (i) **Change in state :** In some reactions the physical state of reactants and products differ from each other.

**For example :**



- (ii) **Change in colour :** Some reactions involve change in colour during formation of products.

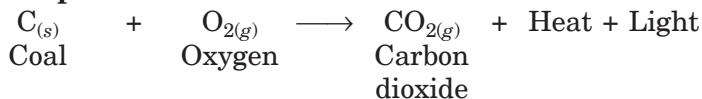
**For example :**



- (iii) **Change in temperature :** In some reactions either energy is absorbed or evolved. Depending upon energy change reactions are of two types :

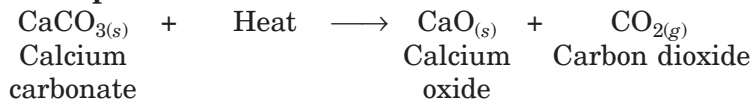
- (a) **Exothermic :** Reactions in which energy is released.

**For example :**



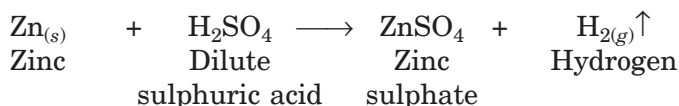
- (b) **Endothermic :** Reactions in which energy is absorbed.

**For example :**



(iv) **Evolution of gas** : Some chemical reactions are accompanied with evolution of a gas.

**For example :**



- **Chemical equations** : Representation of a chemical reaction in terms of symbols and formulae of the reactants and products is known as chemical equation.

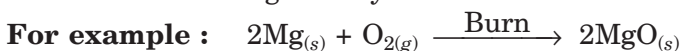
The necessary conditions such as temperature, pressure or any catalyst should be written on arrow between reactants and products. A chemical equation can be made more informative by mentioning reaction conditions (such as temperature, pressure, catalyst), physical states of reactants and products [(s), (l), (g), (aq)], heat absorbed or evolved, concentration of reactants and products [(conc), (aq)].

- **Balanced chemical equations** : The chemical equation in which the no. of atoms of different elements is the same on both sides of the arrow is called a balanced chemical equation. All the equations should be balanced to be in accordance to law of conservation of mass. It states that “Mass can neither be created nor destroyed in a chemical reaction. So, number of elements involved in chemical reaction should remain constant at reactant and product side.”

- **Types of Chemical Reactions**

The chemical reactions can be classified into different types such as :

- (a) **Combination reaction** : The reactions in which two or more substances combine to form a new substance are called combination reactions. These reactions are called synthesis reactions. However, all combination reactions are not synthesis reactions, these reactions are generally exothermic in nature.



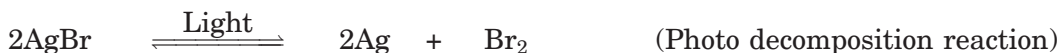
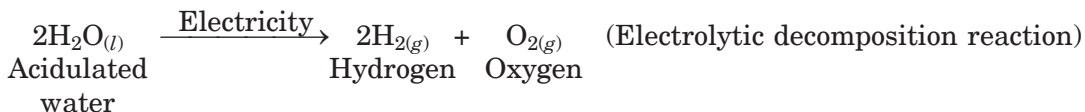
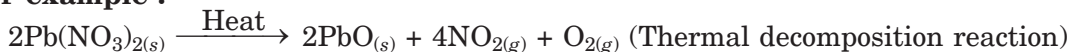
- (b) **Decomposition reaction** : The reaction in which a single compound breaks up into two or more simpler substances are called decomposition reactions. Decomposition reactions are generally endothermic in nature. Energy may be involved in form of heat, light or electricity.

(a) If energy is involved in form of light is called **photo decomposition reaction**.

(b) If energy is involved in form of electricity is called **electrolytic decomposition reaction**.

(c) If energy is involved in form of heat is called **thermal decomposition reaction**.

**For example :**



**Q. 8. Why is the number of stomata greater on the lower surface of a leaf?**

**Ans.** To avoid water loss through transpiration, more stomata are present on the lower surface than the upper surface of a leaf.

**Q. 9. Why are stomata absent in roots?**

**Ans.** Stomata are present on the aerial plants of a plant for transpiration and gaseous exchange. Roots are present in soil which can block stomata, if present.

**Q. 10. Name the instruments used to measure (a) rate of transpiration (b) size of stomata.**

**Ans.** (a) Potometer  
(b) Porometer

**Q. 11. Tradescantia leaf is usually taken for preparing temporary mount of a leaf peel to observe stomata. Why? Name any two other leaves that can be used for this experiment.**

**Ans.** Tradescantia leaves provide good leaf peel which can easily be separated out. Therefore, it is commonly used for this experiment. Leaves of bryophyllum and lily can also be used for experiment.

**Q. 12. Why do guard cells bend when they become turgid?**

**Ans.** The guard cells bend when they become turgid because of the differential thickening of their inner and outer walls. The wall on inner side of guard cell is thicker and less stretchable as compared to the wall on outer side.

## EXPERIMENT - 2

**To show experimentally that carbon dioxide is given out during respiration.**

**Q. 1. Why should we take germinating seeds and keep them moist for the experiment?**

**Ans.** In germinating seeds, metabolic rate is very high, hence, respiration rate is very fast. These should be kept moist because in absence of moisture, seeds will dry and the rate of respiration will decline drastically.

**Q. 2. The process of respiration is just opposite to the process of photosynthesis. Justify it.**

**Ans.** In respiration, glucose and oxygen ( $C_6H_{12}O_6$  and  $O_2$ ) are the reactants whereas in photosynthesis these are the end products. Respiration is a catabolic process whereas photosynthesis is an anabolic process. Hence, we can say that the above statement is correct.

**Q. 3. How does the use of KOH help to show that  $CO_2$  is released during respiration?**

**Ans.** KOH solution absorbs  $CO_2$  released by germinating seeds which in turn create a partial vacuum in the conical flask, this causes the rise of water level in U-shaped delivery tube. It shows that  $CO_2$  is released during respiration.

**Q. 4. What will happen if in a small tube, NaOH is taken in place of KOH?**

**Ans.** The carbon dioxide produced by germinating seeds will not be absorbed by NaOH solution, hence water level will not rise in delivery tube and the purpose of experiment will be lost.

**Q. 5. What will happen if we take boiled seeds in place of germinating seeds?**

**Ans.** Boiled seeds will not respire, hence the experiment will fail.

**Q. 6. Why should the experimental setup be made airtight?**

**Ans.** The experimental setup should be made airtight so that no air enters inside and CO<sub>2</sub> produced during respiration does not escape.

**Q. 7. When oil spreads on the surface of seawater how does it affect the flora and fauna of the sea?**

**Ans.** When oil layer spreads on seawater, it cuts the supply of air. Aquatic animals and plants will die as they will not be able to respire.

**Q. 8. When we say the plants and animals respire, where exactly is the process occurring?**

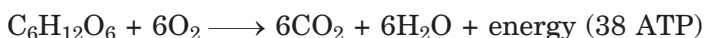
**Ans.** Mitochondria of the cell.

**Q. 9. Why do we use germinating seeds in this experiment?**

**Ans.** Germinating seeds respire actively at a faster rate.

**Q. 10. Give chemical equations of aerobic and anaerobic respiration.**

**Ans. Aerobic :**



**Anaerobic :**



**Q. 11. How respiration is different from breathing? Give four points.**

**Ans.**

S.No.	Respiration	Breathing
1.	It is cellular and biochemical process.	It is an extracellular and mechanical process.
2.	Energy is released.	Energy is not released.
3.	It involves action of enzymes.	It does not involve action of enzymes.
4.	It occurs both in plants and animals.	Occurs only in animals, not in plants.

**Q. 12. Write down difference between aerobic and anaerobic respiration.**

**Ans.**

S.No.	Aerobic	Anaerobic
1.	It takes place in presence of O <sub>2</sub> .	It takes place in absence of O <sub>2</sub> .
2.	Complete oxidation take place.	Incomplete oxidation take place.
3.	38 ATPs are produced.	2 ATPs are produced.
4.	End products are CO <sub>2</sub> and H <sub>2</sub> O acid.	End products are ethyl alcohol and CO <sub>2</sub> or lactic acid.

## EXPERIMENT - 3

**To study :**

(a) binary fission in *Amoeba*

(b) budding in yeast and *hydra* with the help of prepared slides

**Q. 1. Which organisms have better survival value asexually or sexually reproducing and why?**

**Ans.** Sexually reproducing as they show variations and better adaptability also.



**Q. 2. How budding in yeast is different from budding in hydra?**

Ans.	S.No.	Budding in yeast	Budding in hydra
	1.	Bud is unicellular.	Bud is multicellular.
	2.	Bud separate out, or may produce another bud thus chain of buds are formed.	Bud detaches and develop as separate organism.

**Q. 3. Which type of cell division is involved in binary fission?**

**Ans.** Mitosis in which chromosome number remains equal.

**Q. 4. Difference between asexual and sexual reproduction.**

Ans.	S.No.	Asexual	Sexual
	1.	Single parent is involved.	Both parents are involved
	2.	No gamete formation.	Gamete formation occurs.
	3.	No fertilisation occurs.	Fertilisation occurs.
	4.	No zygote formation.	Zygote formation occurs.
	5.	It is a fast process.	It is a slow process.
	6.	All daughter cells are identical.	All daughter cells are not identical, variations occur.

**Q. 5. Out of asexual and sexual reproduction, which one is faster, why?**

**Ans.** Asexual reproduction, because it only requires one simple cell division while in sexual reproduction, more events occurs. So, larger time is require.

**Q. 6. Offspring formed by asexual reproduction are called clones. Why are they called so?**

**Ans.** All offspring formed by asexual reproduction are morphologically and genetically similar to each other. Hence, they are called clones.

**Q. 7. Give the technical terms for the :**

(a) division of cytoplasm.

(b) division of nucleus.

**Ans.** (a) Cytokinesis

(b) Karyokinesis

**Q. 8. Give the name of an organism which is reproduced by longitudinal binary fission.**

**Ans.** Euglena of leishmania.

**Q. 9. What is the significance of reproduction?**

**Ans.** (a) For continuity of life.

(b) For evolution.

(c) For variation.

(d) For the maintenance of population.

**Q. 10. How many types of fission are there?**

**Ans.** Two types that are binary fission and multiple fission.

**Q. 11. In binary fission, how many new daughter cells are formed at a time?**

**Ans.** Two and similar to parents.

**Q. 12. What are variations?**

**Ans.** Difference in morphological and physiological characteristics of an individual belonging to a population.

**EXPERIMENT - 4**

**To identify the different parts of an embryo of a dicot seed.**

**Q. 1. What is the name given to the region of embryonic axis between the first node and the radicle?**

**Ans.** Hypocotyl.

**Q. 2. What is the role of cotyledons?**

**Ans.** The cotyledons are the organs which are attached to the embryonal axis. These are generally thick and swollen due to storage of food. This stored food is utilised for the development of embryo. This food also supplies nourishment to young plant until it is in the condition to make food for itself.

**Q. 3. What are the conditions required for germination of seed?**

**Ans.** The conditions required for germination of seed are :

- (a) Adequate moisture.
- (b) Oxygen or air.
- (c) Suitable temperature.

**Q. 4. What is seed dormancy?**

**Ans.** When the seeds are still on the plants or within the fruits or when the conditions are not favourable for germination, the metabolic activities of the embryo slow down. The embryo leads an inactive life. This state of seed is called seed dormancy.

**Q. 5. What is plumule?**

**Ans.** Plumule is the baby shoot with rudimentary leaf like structure which grows into the shoot system.

**Q. 6. What is endosperm?**

**Ans.** Endosperm is the tissue which contains the stored food in the seeds of plant like rice, maize system.

**Q. 7. Do germinating seeds require sunlight?**

**Ans.** No, germinating seeds derive food from the cotyledons and they don't make their own food. So, sunlight is not essential.

**Q. 8. What is a seed?**

**Ans.** Seed is ripened ovule containing an embryo and stores food to support the growth of embryo.

**Q. 9. Which part of the seed absorbs water during germination?**

**Ans.** Micropyle.

**Q. 10. After germination the cotyledons shrink. Why is it so?**

**Ans.** Food stored in cotyledons is used up by the developing embryo. Now, the cotyledons are exhausted.

**Q. 11. What are albuminous and exalbuminous seeds? Give examples.**

**Ans.** Endosperm (food storing tissue) may either be completely consumed by the developing embryo before seed maturation. Such seeds are called exalbuminous seed. Example : Pea, groundnut, bean, etc. Endosperm may persist in mature seeds and can be used up during germination. Such seeds are called as albuminous seeds. Example : Castor, coconut, etc.