

Class 8 Science Chapter 4 Important Questions

Class 8 Science Chapter 4 Important Questions Set – 1

Name some materials which we see around us.

We see around us, chair, pen, pencil, fan, washing machine, bullock cart, cycle, cooking utensils, books, clothes, toys, water, stones and many other objects.

If a blacksmith beats an iron piece with hammer, do you think, it will change its shape? If yes, would you expect a similar change in wood log on beating?

Yes, iron piece will change its shape as it is a metal. It increases in size and does not break. If a wood log is beaten it does not change its shape but it breaks into pieces.

How metals can be distinguished from non-metals?

Metals can be distinguished from non-metals on the basis of their physical and chemical properties.

Can you hold hot metallic pan which is without a plastic or wooden handle and not get hurt?

Perhaps not, because iron rod, nail and copper wire are good conductors of heat and electricity while plastic, wood, sulphur piece, coal piece are poor conductors. Therefore, wooden or plastic handle protects us from being hurt while handling hot things.

Malleability

The property of metals by which they can be beaten into thin sheets is called malleability.

This is a characteristic property of metals. We saw that the shape of the iron nail and the aluminium wire changed on beating. If they were beaten harder these could be changed into sheets. Such as, silver foil used for decorating sweets.

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Boojho is unable to understand that why some objects are referred as “sonorous”? Would you help him?

The objects which are made of metals produce ringing sound when struck hard. Suppose we have two boxes similar in appearance, one made of wood and the other of metal. If we struck hard on wood, no sound will produce. Whereas, metals produce ringing sounds. Hence, they are said to be sonorous. The materials other than metals are not sonorous.

Paheli wants to know the characteristics of metals and non-metals. Would you help her?

The materials which are hard, lustrous, malleable, ductile, sonorous and good conductors of heat and electricity. The materials which generally possess these properties are called metals. The examples of metals are iron, copper, aluminium, calcium, magnesium, etc.

In contrast, materials like coal and sulphur are soft and dull in appearance. They break down into powdery mass on tapping with hammer. They are not sonorous and are poor conductors of heat and electricity. These materials are called non-metals. The examples of non-metals are sulphur, carbon, oxygen, phosphorus, etc.

Do you know the name of metal which is found in liquid state in room temperature?

Mercury is the only metal which is found in liquid state at room temperature.

With the help of an activity, how do you check the nature of rust?

To check the nature of rust formed as a result of the reaction between iron, oxygen and water. Collect a spoonful of rust and dissolve it in a very little amount of water. We will find that the rust remains suspended in water. Shake the suspension well. Test the solution with red and blue litmus papers. Our observation is that the red litmus turns blue. That means, oxide of iron is basic in nature.

Rusting of Iron

Rusting of iron refers to the formation of rust, a mixture of iron oxides, on the surface of iron objects or structures.

When iron reacts with oxygen and moist as form of water vapours. It creates rust on iron. Rust changes the property of iron. Although, rust is a chemical change as the iron is changed into a new substance.

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Generally, oxides of non-metals are acidic in nature. Discuss, with the help of an activity.

Take a small amount of powdered sulphur in a deflagrating spoon or metallic cap of any bottle and heat it. As soon as sulphur starts burning, introduce the spoon into a gas jar or glass tumbler. Cover the tumbler with a lid to ensure that the gas produced does not escape. Remove the spoon after some time. Add a small quantity of water into the tumbler and quickly replace the lid. Shake the tumbler well.

The name of the product formed in the reaction of sulphur and oxygen is sulphur dioxide gas. When sulphur dioxide is dissolved in water sulphurous acid is formed. The reaction can be given as follows:

Sulphur dioxide (SO_2) + Water (H_2O) \rightarrow Sulphurous acid (H_2SO_3). Check the solution with red and blue litmus papers. The sulphurous acid turns blue litmus paper red. That means, oxides of non-metals are acidic in nature.

Do you have any idea that when metals and non-metals reacted with water?

We know that sodium metal is very reactive. It reacts vigorously with oxygen and water. A lot of heat is generated in the reaction. Some other metals do not do so. For example, iron reacts with water slowly. Generally, non-metals do not react with water though they may be very reactive in air. Such non-metals are stored in water. For example, phosphorus is a very reactive non-metal. It catches fire if exposed to air. To prevent the contact of phosphorus with atmospheric oxygen, it is stored in water.

Is there any difference in the way of metals and non-metals when they react with acids? Show with an activity.

Take samples of metals and non-metals as:

Magnesium(ribbon), Aluminium (foil), Iron (filings), Copper (peeled flexible wire), Charcoal (powder), Sulphur (powder) in separate test tubes and label them as A, B, C, D, E, and F.

With the help of a dropper add 5 mL of dilute hydrochloric acid to each test tube one by one. Observe the reactions carefully. If no reaction occurs in a cold solution, warm the test tube gently. Bring a burning matchstick near the mouth of each test tube.

You can listen the 'pop' sound in some cases be due to when a burning match stick is

brought near the mouth of the test tubes.

You must have found that non-metals generally do not react with acids but metals react with acids and produce hydrogen gas that burns with a 'pop' sound.

Boojho wants to perform an activity, which help him to understand the displacement reaction. Can you help him?

Take five 100 mL beakers and label them A, B, C, D and E. Take about 50 mL of water in each beaker. Dissolve in each beaker a teaspoonful of each substances.

Beaker A: Copper sulphate (CuSO_4) + Zinc granule (Zn),

Beaker B: Copper sulphate (CuSO_4) + Iron nail (Fe),

Beaker C: Zinc sulphate (ZnSO_4) + Copper turnings (Cu),

Beaker D: Iron sulphate (FeSO_4) + Copper turnings (Cu),

Beaker E: Zinc sulphate (ZnSO_4) + Iron nail (Fe)

Keep the beakers undisturbed for some time.

In beaker [A] zinc (Zn) replaces copper (Cu) from copper sulphate (CuSO_4). That is why the blue colour of copper sulphate disappears and a powdery red mass of copper is deposited at the bottom of the beaker. Similarly, iron replaces the copper in Beaker [B]. Since we do not see any change in beaker [C], [D], and [E].

Remember that science is not arbitrary. It follows definite rules based on facts. And the rule here is that zinc is more reactive than copper and iron. A more reactive metal can replace a less reactive metal, but a less reactive one cannot replace a more reactive metal.

[Note: The order of activity for metals, from most reactive to least reactive, is: Li, K, Sr, Na, Ca, Mg, Al, Zn, Cr, Fe, Cd, Co, Ni, Sn, Pb, H, Sb, As, Bi, Cu, Hg, Ag, Pd, Pt, and Au.]

Displacement Reaction

In a chemical reaction, when a more reactive metal displaces the less reactive metal from its salt solution, it is called displacement reaction. As an example: zinc can displace copper from its copper sulphate solution as zinc is more reactive than copper.

Less reactive metal cannot displace the more reactive metal from its salt solution.

As an example: copper cannot displace zinc from its solution zinc sulphate as copper is less reactive than zinc.

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Why do copper utensils get greenish deposits on their surface on standing for long time?

After a long standing, the copper of utensils, reacts with oxygen of air and forms its oxides which are greenish in nature. That is why, the copper utensils get green deposition on their surface on long standing.

Explain, why zinc metal can displace copper from copper sulphate solution but copper cannot displace zinc from zinc sulphate solution?

Zinc metal can displace copper from copper sulphate solution as zinc is more reactive than copper. But copper cannot displace zinc from zinc sulphate solution because copper is less reactive than zinc.

Sodium metal is kept in kerosene but not in water. Why?

Sodium metal is highly reactive metal, when exposed in air it starts to burn to form oxide. In the same way, it forms hydroxide with water. It does not react with kerosene. So, to prevention against any reaction, it is kept in kerosene not in water.

Paheli wants to know that magnesium is found in plants but in, what forms is it found in them?

The most common soluble sources of magnesium to use as fertilizer are magnesium sulphate, sulphate of potash magnesia and magnesium oxide. Besides these, magnesium is found in plants in the form of chlorophyll. It is present in the chlorophyll of the plant and helps in photosynthesis.

Uses of Metals and Non-Metals

Metals are used in making machinery, automobiles, aeroplanes, trains, satellites, industrial gadgets, cooking utensils, water boilers, etc. You are also familiar with the uses of some non- metals.

Non-metal essential for our life which all living beings inhale during breathing. Non-metals used in fertilisers to enhance the growth of plants. Non-metal used in water purification process. Non-metal used in the purple coloured solution which is applied on wounds as an antiseptic. Non-metals also used in crackers.

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Which non-metal is used to disinfect water?

Chlorine which is non-metal, is used in water purification plants because chlorine has the ability to kill germs.

Can you store lemon pickle in an aluminium utensils? Explain.

No, we cannot store lemon pickle in aluminium utensils, as metal react with acids to liberate hydrogen gas. The pickle (which is acidic in nature) can be spoiled.

Iron is more reactive than copper, can you write an activity to show this?

Take about 50 ml of water in a beaker and dissolved 5 gram of copper sulphate in it to obtain copper sulphate solution (which is blue in colour). Put a clean iron nail in the solution and keep the beaker and disturb for some time.

We will find that the colour blue colour of copper sulphate solution starts fading gradually and the iron nail gets covered with the “Red Brown” layer of copper metal. It is because iron is more reactive than copper, so it displaces copper metal from its solution of copper sulphate. It is the copper metal set free from its compound which forms a “Red Brown” layer on the surface of iron nail.

Copper sulphate + Iron → Iron sulphate + Copper
(Blue solution) (Grey) (Greenish Solution) (Red-brown)

One day Rita went to a Jewellers shop with her mother. Her mother gave old gold jewellery to the goldsmith to polish. Next day, when they brought the jewellery back, they found that there was a slightly loose in its weight. Can you suggest a reason for the loss in weight?

To polish a gold ornament, it is dipped in an acid (called Aqua Regia). The outer layer of gold dissolves in the acid and the inner shiny layer is visible. Because of loss of upper layer of jewellery, its weight is reduced.