

## Physical Changes/Chemical Changes

1 To remove the wallpaper in her room, Stephanie uses an appliance that produces a spray of steam.

Which statement explains the change that takes place?

- A) This is a chemical change because the steam burns the wallpaper.
- B) This is a physical change because the steam burns the wallpaper.
- C) This is a chemical change because the steam dissolves the glue holding the wallpaper on the wall.
- D) This is a physical change because the steam dissolves the glue holding the wallpaper on the wall.

2 For each of the following, state whether the change is chemical or physical.

- a) The formation of acid-rain from the gaseous emissions of coal-burning industries
- b) The disappearance of snow in the spring
- c) The aeration of the water in an aquarium
- d) The tarnishing of a coin

3 From among the following phenomena, identify which represent a physical change. Phenomena

- 1- Milk that goes sour \_\_\_\_\_
- 2- The water cycle \_\_\_\_\_
- 3- Leaves turning colour in the fall \_\_\_\_\_
- 4- Casting aluminium \_\_\_\_\_
- 5- A camp fire \_\_\_\_\_
- 6- Writing with a lead pencil \_\_\_\_\_

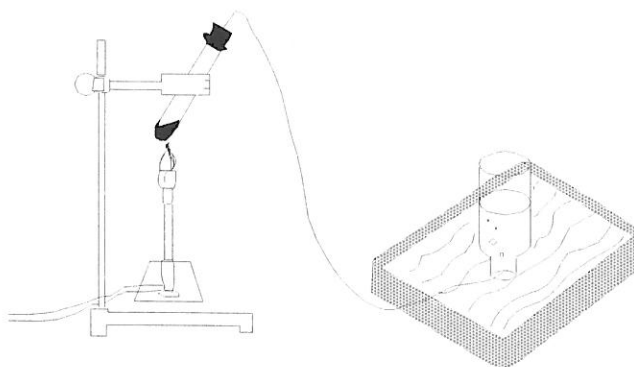
4 Which of the following are physical changes?

- I The burning of gasoline in a lawnmower motor
  - II The dissolving of sugar in hot coffee
  - III The shattering of a glass
  - IV The rusting of a piece of iron
  - V The evaporation of water by the sun's heat
- A) I and II
  - B) I, IV and V
  - C) II and III
  - D) II, III and V



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A student heats 2.0 g of an orange powder in a test tube placed as shown in the diagram below.



Droplets of a silver liquid form on the sides of the test tube and a gas is collected by the displacement of water in a bottle set up for this.

The gas is tested by inserting a glowing splint into the bottle. The glowing splint bursts into flames when it is inserted into the gas collecting bottle.

The mass of the orange powder after heating is 1.6 g.

Which of the following three substances is a compound: the orange powder, the silver droplets or the gas?

Justify your answer.

6

Matthew suggests the following steps as a method of obtaining water vapour.

1. He takes an ice cube from the freezer and lets it melt at room temperature.
2. He carries out electrolysis of the water in order to produce hydrogen ( $H_2$ ) and oxygen ( $O_2$ ).
3. He mixes both gases together in a container.
4. He uses an electric spark to make the gaseous mixture explode and thus obtain the water vapour.

Which of Matthew's steps involve chemical changes and which involve physical changes?

- A) Chemical changes : 1 and 2; physical changes : 3 and 4
- B) Chemical changes : 2 and 4; physical changes : 1 and 3
- C) Chemical changes : 1 and 3; physical changes : 2 and 4
- D) Chemical changes : 3 and 4; physical changes : 1 and 2

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In the laboratory, you are given a pink powder in a test tube. Your teacher tells you that it is a pure substance.

When you heat the test tube, you observe that a gas is given off and a black residue forms.

What can you conclude about the original substance?

- A) It is an element.
- B) It is a compound.
- C) It is a solution.
- D) It is a mixture.



8

In winter, we observe many changes resulting from the variations in temperature and from the use of salt on the roads.

Listed below are some of these changes.

1. The transformation of water into ice
2. The corrosion of automobile metal
3. The anti-freeze that vaporizes from the windshield
4. The combustion of gasoline
5. The formation of frost on the windows of automobiles

Which of the following includes only physical changes?

- A) 1, 2 and 3
- B) 1, 2 and 4
- C) 1, 3 and 5
- D) 2, 4 and 5

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In the lab, you perform an experiment to identify a solid compound, X. You follow a given procedure, and after heating the solid X, you obtain a new solid and a gas.

The table below summarizes the results obtained.

Properties	Solid	Gas
Mass	6.52 g	0.16 g
Volume	0.73 mL	113 mL
Electrical Conductivity	very good	-----
Solubility in water	insoluble	-----
Magnetic Properties	none	-----
Lime water test	-----	no reaction
Flame test	-----	flame burns more brightly

Using reference materials, identify both the solid and the gas obtained by heating substance X as well as the solid compound X.

Justify your answer using the observed results



10

Which of the following statements describe a physical change?

1. The nature of the substance does not change.
2. The nature of the substance is changed.
3. The characteristic properties are not changed.
4. The characteristic properties are changed.

- A) 1 and 3
- B) 1 and 4
- C) 2 and 3
- D) 2 and 4

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Classify the following changes as physical or chemical.

1. A burning candle \_\_\_\_\_
2. A metal sheet that has rusted \_\_\_\_\_
3. A pencil lead that has broken \_\_\_\_\_
4. Carbon dioxide gas bubbling from a soft drink \_\_\_\_\_
5. A plant producing its food by photosynthesis \_\_\_\_\_
6. A desalination factory removing the salt from sea-water to produce drinking water \_\_\_\_\_
7. A rock split by the action of ice \_\_\_\_\_
8. A compass deflected by a magnet \_\_\_\_\_
9. The leaves changing color in the autumn \_\_\_\_\_
10. A candle melted by the sun \_\_\_\_\_





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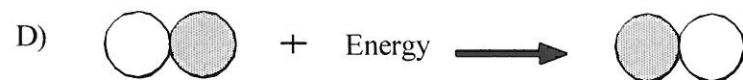
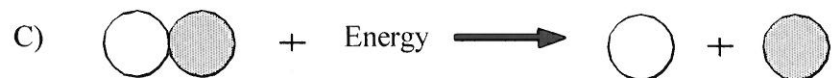
The state of four substances before and after having been heated in the laboratory is presented in the following table.

Substance	Before Heating	After Heating
1	Dark gray solid	Purple gas
2	White solid	Colourless liquid
3	Red solid	Gray liquid and colourless gas
4	Brown liquid	Orange-brown gas

According to this information, which substance was a compound before being heated?

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Which of the following illustrates the formation of a compound from its elements?





14 A student heated a pure substance in a crucible and made the following observations :

	Substance before Heating	Substance after Heating
State	Solid	Liquid
Colour	White	Pink
Mass	5.0 g	7.2 g

Given these observations, which of the following statements is TRUE?

- A) The substance before heating was definitely an element.
- B) The substance before heating was definitely a compound.
- C) The substance after heating was definitely an element.
- D) The substance after heating was definitely a compound.

15 A burning splint is used to test for hydrogen gas. Hydrogen gas,  $H_2$ , reacts with oxygen gas,  $O_2$ , to form water,  $H_2O$ .

Which of the following statements is TRUE?

- A) This water is a pure substance consisting of elements that are chemically bonded.
- B) This water is a pure substance consisting of compounds that are chemically bonded.
- C) This water is a pure substance consisting of a mixture of two compounds that are chemically bonded.
- D) This water is a pure substance consisting of a mixture of elements.

