GRADE 11 CHEMISTRY
Chemical and Physical Change

In addition to the points already in your notes, the following may be of some help in deciding whether a change is physical or chemical in nature.

Remember, a change is chemical if one or more new substances is/are formed. New substances will have different properties from the old. Therefore, any of the following is a clue that a chemical change has occurred.

a) Colour change: a change in colour almost always indicates a new substance has been formed. Not simply a blending of colours, but different that the original.

b) Formation of a precipitate: a precipitate is a solid of low solubility formed from a solution. The presence of a precipitate indicates that a new substance with lower solubility has been formed.

c) Formation of a gas: at the same temperature. Often the pressence of bubbles in a liquid will give you a clue.

d) Energy change: (heat and/or light is released or absorbed) new substances (products) are formed which contain a different amount of energy than the starting substances (reactants). A reaction which releases energy is called exothermic. A chemical reaction which absorbs energy is called endothermic.

QUESTIONS

For each of the following, classify the change as either chemical or physical. Give one good reason for each answer.

a) burning wood in a fireplace
b) boiling water on the stove
c) an Alka-Seltzer tablet is added to a glass of water
d) photosynthesis
e) a spoonful of sugar is added to water and stirred
f) evaporation of water from a dish
g) rotting of dead leaves on the forest floor
h) cooking a roast in the oven

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Identify each of the following as a PHYSICAL CHANGE or a CHEMICAL CHANGE. If it is a chemical change, state your evidence.

1. $2H_2O \rightarrow 2H_2 + O_2$ _____
2. melting ice _____
3. tarnishing silver _____
4. molding clay _____
5. burning wood _____
6. digesting food _____
7. sharpening a pencil _____
8. boiling an egg _____
9. breaking glass _____
10. cutting bread _____
11. sand and water → water and sand _____
12. baking bread _____
13. a rusting nail _____
14. filtering water from a pond _____
15. $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$ _____
16. iron + copper sulfate → iron sulfate + copper _____
17. boiling water _____
18. boiling soup _____

Physical vs. Chemical Properties

A physical property is observed with the senses and can be determined without destroying the object. For example colour, shape, mass, length and odor are all examples of physical properties.

A chemical property indicates how a substance reacts with something else. The original substance is fundamentally changed in observing a chemical property. For example, the ability of iron to rust is a chemical property. The iron has reacted with oxygen, and the original iron metal is changed. It now exists as iron oxide, a different substance.

Classify the following properties as either chemical or physical by putting a check in the appropriate space.

		Physical Property	Chemical Property
1.	Blue colour	_____	_____
2.	Density	_____	_____
3.	Flammability	_____	_____
4.	Solubility	_____	_____
5.	Reacts with acid to form H_2	_____	_____
6.	Supports combustion	_____	_____
7.	Sour taste	_____	_____
8.	Melting point	_____	_____
9.	Reacts with water to form a gas	_____	_____
10.	Reacts with a base to form water	_____	_____
11.	Hardness	_____	_____
12.	Boiling point	_____	_____
13.	Can neutralize a base	_____	_____
14.	Luster	_____	_____
15.	Odor	_____	_____