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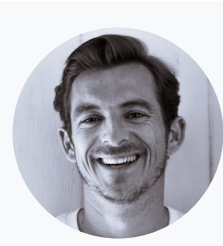
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Chemistry Notes

1) Making Observations. (collecting data). 1-3

- qualitative observations = describe characteristics,
- quantitative observations = involve both a number and a unit.

2) Formulating a Hypothesis. (making a prediction).

- a possible explanation for an observation.

3) Performing Experiments. (testing the hypothesis).

- experiments usually always lead to new, unexpected observations, which brings the process back to step 1:



4) Assembling Hypothesis into a Theory.

- an accepted explanation.
- a set of tested hypothesis that gives an overall explanation of why nature is behaving a certain way.

When a theory is observed in many different situations and is generally taken as fact rather than just an "accepted explanation," it becomes law.

4 out of 15 pages

Section 1 = Structural, Bonding, and Molecular Properties of Organic Molecules. 1-1

1) Organic Chemistry = the study of compounds of carbon.

- naturally occurring compounds (DNA, proteins, carbohydrates).
- synthetic compounds also (drugs, pesticides).

2) Some Review:

- * Lewis Structures = they show the two-dimensional connections of atoms.
 - show valence e⁻s only.
 - bonds (a shared e⁻) are shown as "lines".
 - nonbonding e⁻s (lone pairs) are shown as "dots".
 - 2 things to consider:

① Octet Rule = 2nd row elements (B, C, N, O, F) want to form bonds such that they acquire 8 shared valence e⁻s.

- Hydrogen = only wants 2 valence e⁻s.
- 1st and 2nd row elements = can sometimes have fewer than 8 valence e⁻s but never more.
- 3rd row elements and lower = d-orbitals allow for more than 8 electrons.

Section II = Solutions and their Properties. 11-1

→ most substances we encounter are mixtures = wood, gas, milk, champagne, air, steel, etc...

→ when the components are uniformly intermingled or mixed, the homogeneous mixture is a solution.

1) Solution Composition.

→ solutions can be dilute or concentrated, but we need to define "solution composition" more precisely to do calculations.

→ there are several methods for determining a solution's concentration.

① Molarity →
$$M = \frac{\text{moles solute}}{\text{L solution}}$$
 or (m = mol/L)
↳ "molar"

② Molality →
$$m = \frac{\text{moles solute}}{\text{kg solvent}}$$
 or (m = mol/kg)
↳ "molal"

③ Mass Percent →
$$\frac{\text{mass solute}}{\text{mass solution}} (\%)$$

④ Mole Fraction →
$$X_{\text{solute}} = \frac{\text{moles solute}}{\text{moles of solution}}$$

⑤ Normality →
$$N = \frac{\text{eq. of equivalents}}{\text{L solution}}$$
 ↳ "normal"