

1. Write the ion symbol for the following ions:

Example: calcium = Ca^{2+}

- A) phosphide = P^{-3} B) magnesium = Mg^{2+} C) rubidium = Rb^{+}
 D) fluoride = F^{-} E) aluminum = Al^{3+} F) sulfide = S^{-2}

2. Write the formulas for the compound formed by the combination of the following pairs of atoms.

Example: nitrogen and magnesium = Mg_3N_2

- A) rubidium and sulfur = Rb_2S B) aluminum and fluorine = AlF_3
 C) phosphorus and calcium = Ca_3P_2 D) magnesium and oxygen = MgO

3. When writing chemical formulas, the
- +
- element always goes first, and the
- (-)
- element is written second.

Periodic Table - Element Questions & Naming & Formulas

(subtract for neutrons, the number of electrons (e-) changes to make ions)

4. What is the formula for Copper II Nitrate? $\text{Cu}^{+2} \text{NO}_3^{-1}$ $\text{Cu}(\text{NO}_3)_2$
 5. What is the formula for Strontium Phosphide? $\text{Sr}^{+2} \text{P}^{-3}$ Sr_3P_2
 6. What is the formula for Lead IV Selenide? $\text{Pb}^{+4} \text{Se}^{-2}$ $\text{Pb}_2\text{Se}_4 = \text{PbSe}_2$
 7. How many electrons would Na^+ have? 10 $_{11}\text{Na}$
 8. How many electrons would P^{3-} have? 18 $_{15}\text{P}$
 9. What would the name of FeBr_3 be? $+3 -1$ Iron III bromide
 10. Write the formula for ammonium sulfate. $(\text{NH}_4)_2\text{SO}_4$
 $\text{NH}_4^+ \text{SO}_4^{2-}$

11. Write the formula or the name to go with the other:

- a. Copper (II) phosphate: $\text{Cu}^{2+} \text{PO}_4^{3-}$ $\text{Cu}_3(\text{PO}_4)_2$ d. calcium nitride: $\text{Ca}^{2+} \text{N}^{3-}$ Ca_3N_2

- b. Na_3PO_4 sodium phosphate e. S_2O_7 disulfur heptoxide

- c. dinitrogen monoxide N_2O f. FeCl_3 Iron III Chloride

12. Be able to distinguish between ionic and covalent substances. Which would these be, Ionic or Covalent?

Metal Al_2S_3 I
 Nonmetals only SF_5 C
 Metal CaF_2 I
 N_2O_3 C
 CF_4 C (use prefixes)

13. Be able to name compounds, ionic or covalent. Name the compounds above:

aluminum sulfide | sulfur pentafluoride | Calcium fluoride | dinitrogen trioxide | carbon tetrafluoride

14. How do you distinguish ionic compounds from covalent?

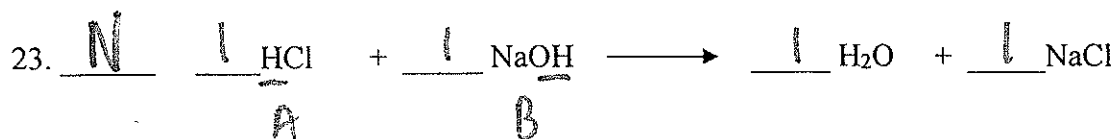
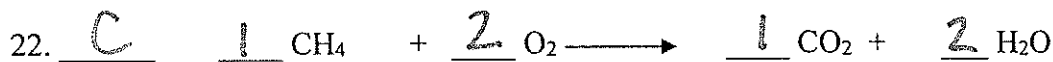
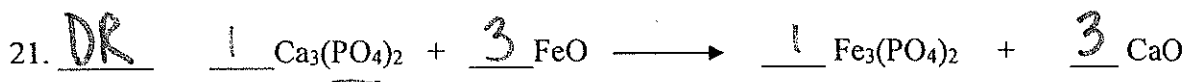
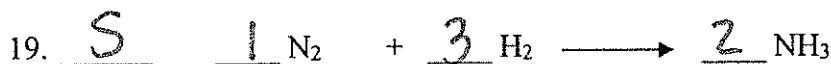
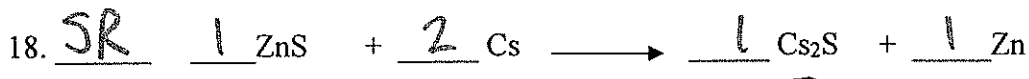
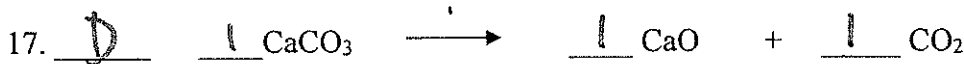
covalent is only nonmetals

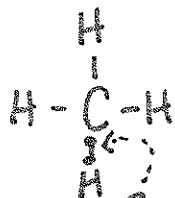
Write and balance reactions:

15. What side of the equation are the reactants on? LEFT

16. What side of the equation are the products on? RIGHT

Balance the following equations by placing the correct coefficient in front of each formula/symbol. 2nd - label what type of reaction each is: Synthesis (S), Decomposition (D), Single Replacement (SR), Double Replacement (DR), Combustion (C), Neutralization (N)





Be able to work with Lewis structures.

24. Each line on a Lewis structure represents 2 electrons shared between the atoms.

25. The valence electrons are the ones that are shared on a Lewis Structure.

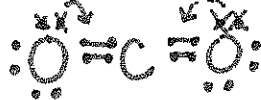
26. Atoms need 8 electrons around them to be stable, except small atoms like hydrogen that only need 2.
 Like Helium Like Noble gases

27. Now draw the Lewis structure for water.



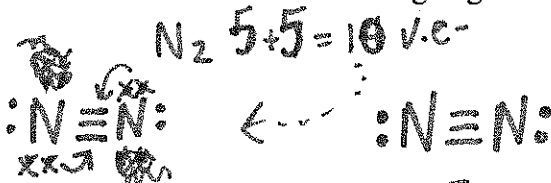
used the 8 v.e. (valence electrons)

28. Now draw the Lewis structure for carbon dioxide CO_2 .



$4 + 6 \times 2 = 16 \text{ v.e.}$

29. Draw the Lewis structure for nitrogen gas:



See the supplement sheet on this

30. Organic compounds contain CARBON.

31. Hydrocarbons also contain hydrogen.

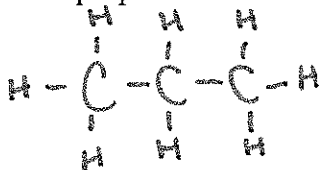
32. Hydrocarbons with only single (covalent or ionic?) bonds are called ALKANES.

33. In a single covalent bond, (1 2 or 3?) electrons are (shared or lost/gained?)

Given this chart, be able to draw any of the alkanes.

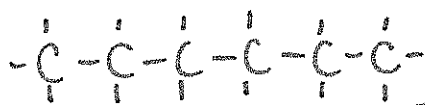
34. Draw propane below:

Write its formula C_3H_8



35. Draw hexane below:

Write its formula C_6H_{14}

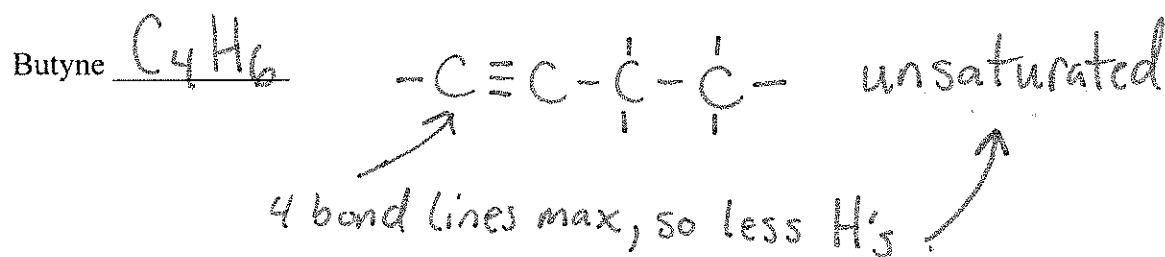
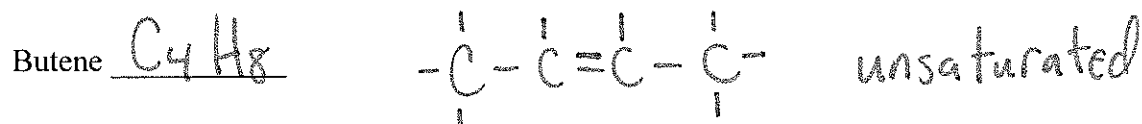
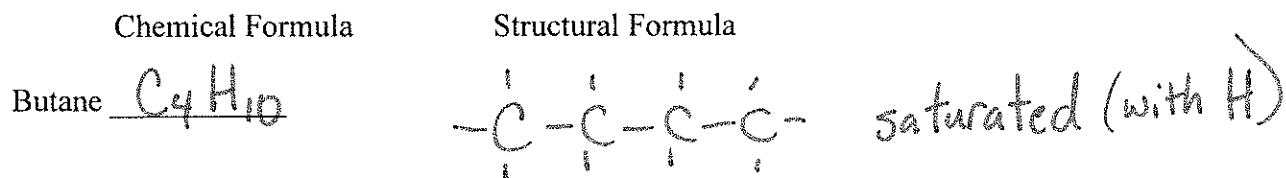


H's NOT shown

Note: 4 bond lines around a carbon gives it 8 electrons stable shared.

Prefix	Number of Carbon Atoms
meth-	1
eth-	2
prop-	3
but-	4
pent-	5
hex-	6
hept-	7
oct-	8
non-	9
dec-	10

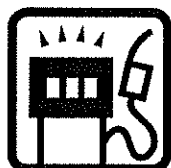
36. Draw butane, butene, and butyne, and include the chemical formula for each one.



37. Another word for burning is combustion

38. When burning hydrocarbons, like wax, the hydrocarbon combines with oxygen, O_2 and forms two products: water and carbon dioxide

H_2O CO_2



High Octane -

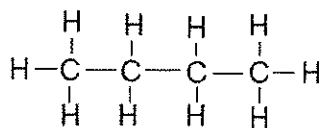
What are isomers and why do they matter?

Goals:

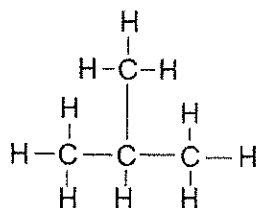
- Discover what isomers are compared to the hydrocarbons we've already learned about.
- Draw the structural formula for isomers of hydrocarbons from the alkane family of hydrocarbons.

Real-World Application:

Your car isn't running right. It has an engine knock and continues to sputter along for a short time even after you turn the key off. Your mom says that you should try a higher octane gasoline. It works, but now you're wondering why you're paying extra for that type of gasoline. (Hint: It's because of isomers in the fuel. And, you may need a tuneup)

Isomers of Butane: Background Information: Work with a Partner

(molecule A)



(molecule B)

39. Explain what is different about the molecules of butane above.

different branching structure

40. Now describe what is the same between these molecules of butane.

same chemical formula, C_4H_{10}

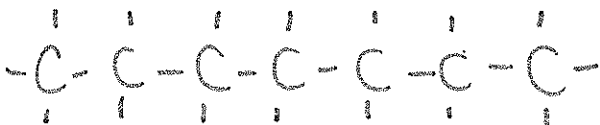
41. Describe, in your own words, what an isomer of a molecule is.

A molecule with a different structure, but the same formula

Given this chart, be able to draw any of the alkanes.

42. Draw heptane below:

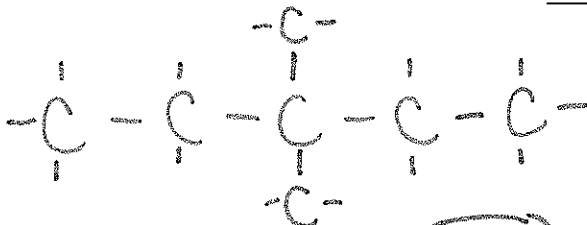
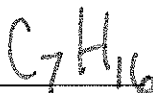
Write its formula



Prefix	Number of Carbon Atoms
meth-	1
eth-	2
prop-	3
but-	4
pent-	5
hex-	6
hept-	7
oct-	8
non-	9
dec-	10

43. Now draw an isomer of heptane:

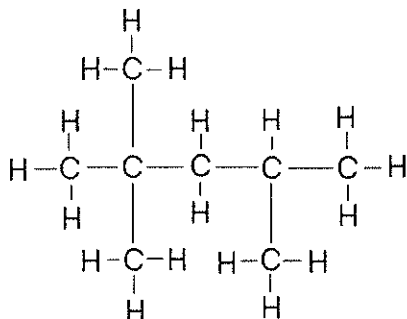
Write its formula



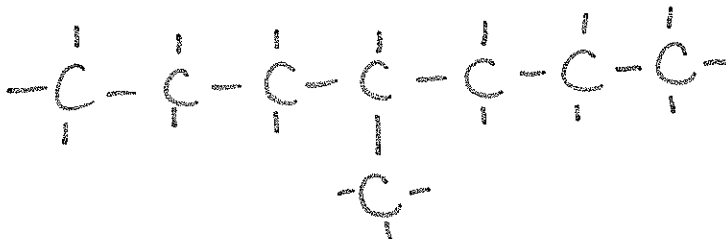
44. An isomer of a hydrocarbon has (a different or the same?) structure/branching,
(a different or the same?) chemical formula, and
(a different or the same?) chemical and physical properties.

45. The following is an isomer of what alkane? Name: Octane

Formula: C_8H_{18}



46. Draw a different isomer of the alkane in the previous question. What is its chemical formula? C_8H_{18} Would it have the same properties as the one from the previous question?



Acids & Bases Review

Place the word(s) or symbol that goes with each word or words below:

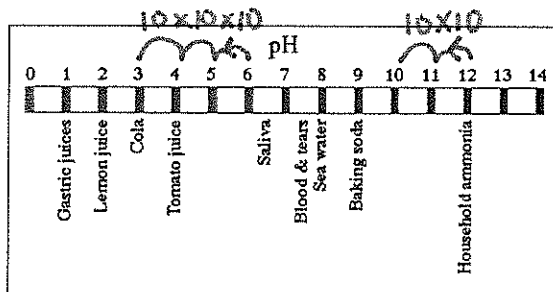
- 47. Acid ions - H^+ combines with water to form H_3O^+ , hydronium ion.
- 48. Base ion - OH^- hydroxide ion
- 49. Scale that measures how acidic or basic something is - pH
- 50. Acid/Base Indicators (name 2) universal indicator, litmus
- 51. HCl - (name & acid or base or salt?) hydrochloric acid
- 52. K_2SO_4 - (name & acid or base or salt?) potassium sulfate
- 53. H_2SO_4 - (name & acid or base or salt?) sulfuric acid
- 54. NH_4Cl - (name & acid or base or salt?) ammonium chloride
- 55. $NaOH$ - (name & acid or base or salt?) sodium hydroxide
- 56. $Ca(OH)_2$ - (name & acid or base or salt?) calcium hydroxide

57. For neutralization reactions, be able to predict the products. Show an example equation below - use HCl reacting with NaOH:



58. What two things are always produced in a neutralization reaction?

WATER and a SALT



59. Acids have a pH from 0 to 6. Lower numbers mean STRONGER acids.

60. Bases have pH from 8 to 14. Higher numbers mean STRONGER bases.

61. Neutral substances have a pH of 7.

62. A change in pH number of 1 means a change in H^+ ion concentration by a power of 10.

63. If an acid is changed from a pH of 6 to a pH of 3, it is 1,000 times more acidic.

64. If a base is changed from a pH of 12 to a pH of 10, it is 100 times less basic.

65. Why isn't acid rain a problem in our lakes that contain limestone, but is a problem in Northern lakes in areas that only contain granite rock?

limestone acts as a natural base to neutralize acid.

