Layers of Learning

Unit 1-14 Printables

African Tribal Mask Coloring Sheet

Ancient Africa Timeline Squares

Ancient Africa Map

Sahara Trade Routes

African Languages

Africa Country Borders

Africa Countries Labeled

Africa Natural World

Africa Natural and Countries

Electron Configuration

Periodic Table of the Elements

Lewis Dots (with answers)

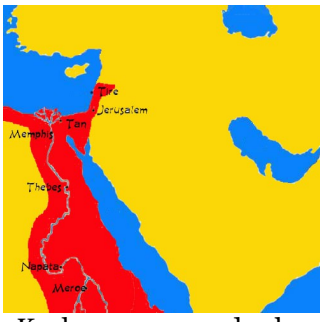
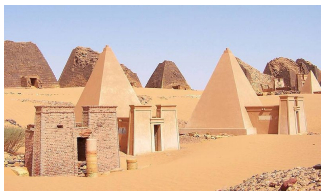
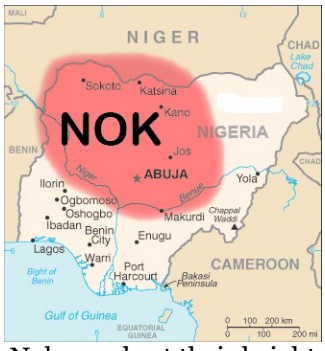
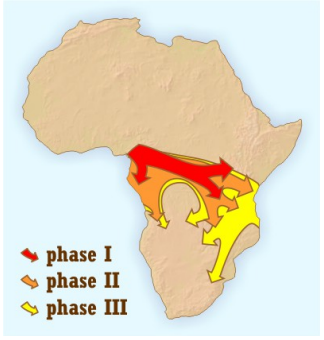
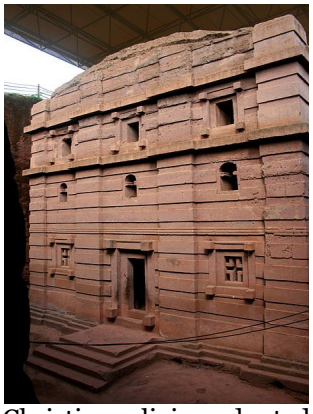
Lewis Dot Diagrams (with answers)

Michelle Copher & Karen Loutzenhiser

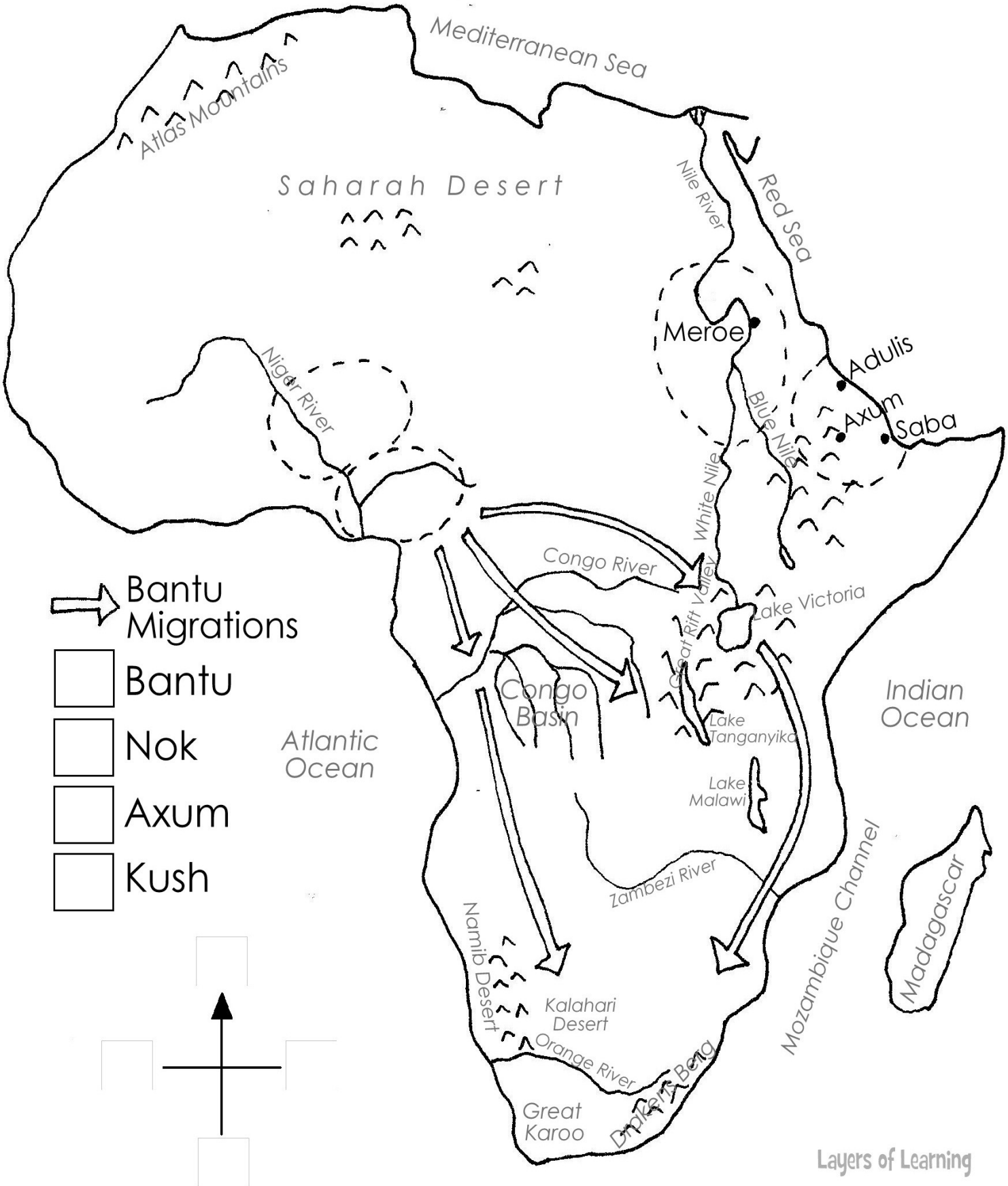
African Tribal Mask

Most African tribal masks are hand-carved from wood. They have been used in spiritual ceremonies for thousands of years. Each tribe had their own specific meanings and significance. Many mask-makers passed on their art and the meanings attached to it to their sons, who continued their trade.

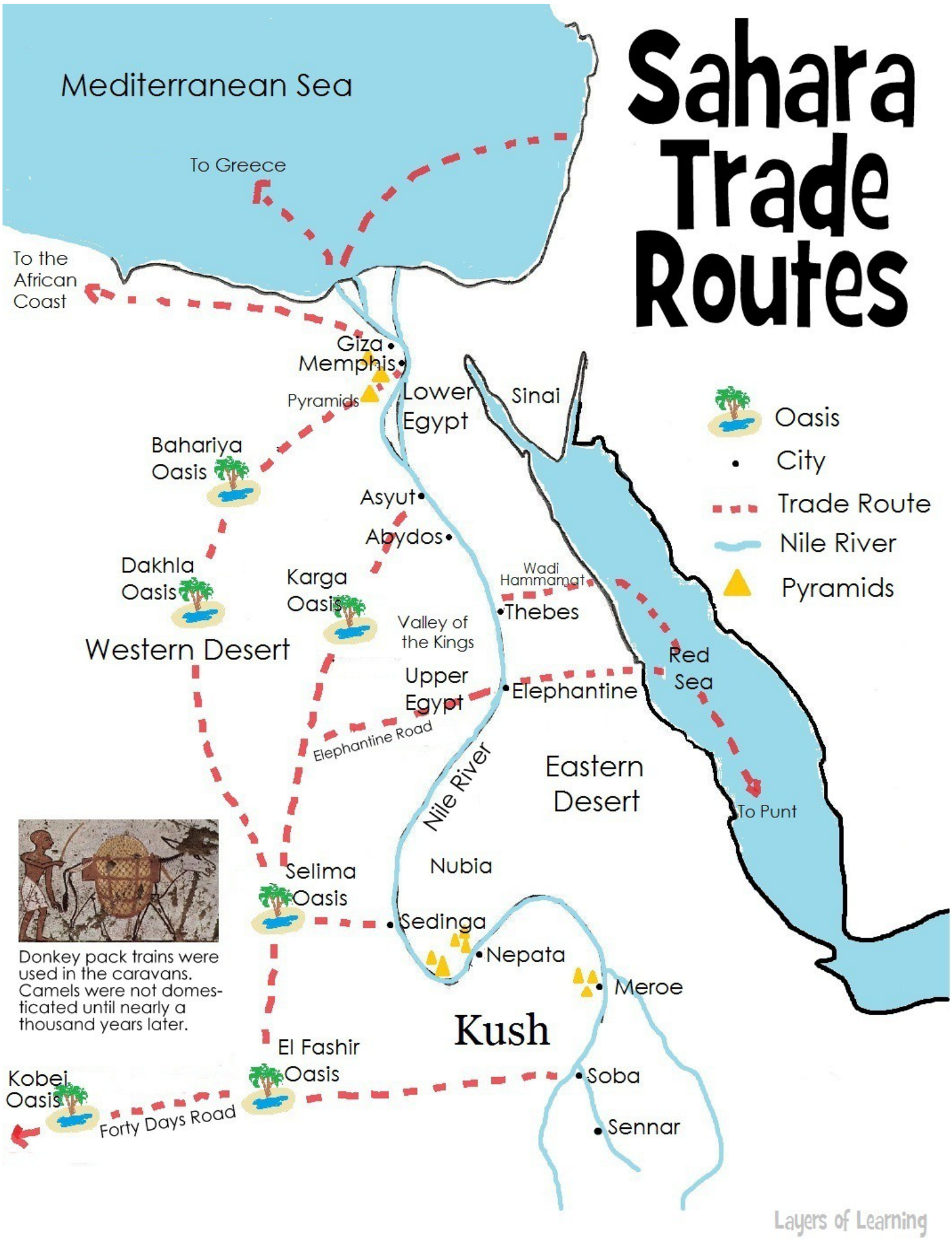
Ancient Africa: Unit 1-14

4000 BC 1-14  Saharan grasslands turn to desert	**1550 BC** 1-14  Kush conquered and ruled by Egypt	**1100 BC** 1-14  Kush regains independence	**715 BC** 1-14  Kush conquers and rules Egypt
664 BC 1-14  Assyrians take Egypt from Kush	**590 BC** 1-14  Meroe becomes the capital city of Kush	**500BC-200AD** 1-14  Nok people at their height	**300 BC** 1-14  Bantu migration begins
100AD-700AD 1-14  Kingdom of Axum at its height	**340 AD** 1-14  Christian religion adopted by King Ezana of Axum	**350 AD** 1-14  Axum defeats Kush	

Ancient Africa

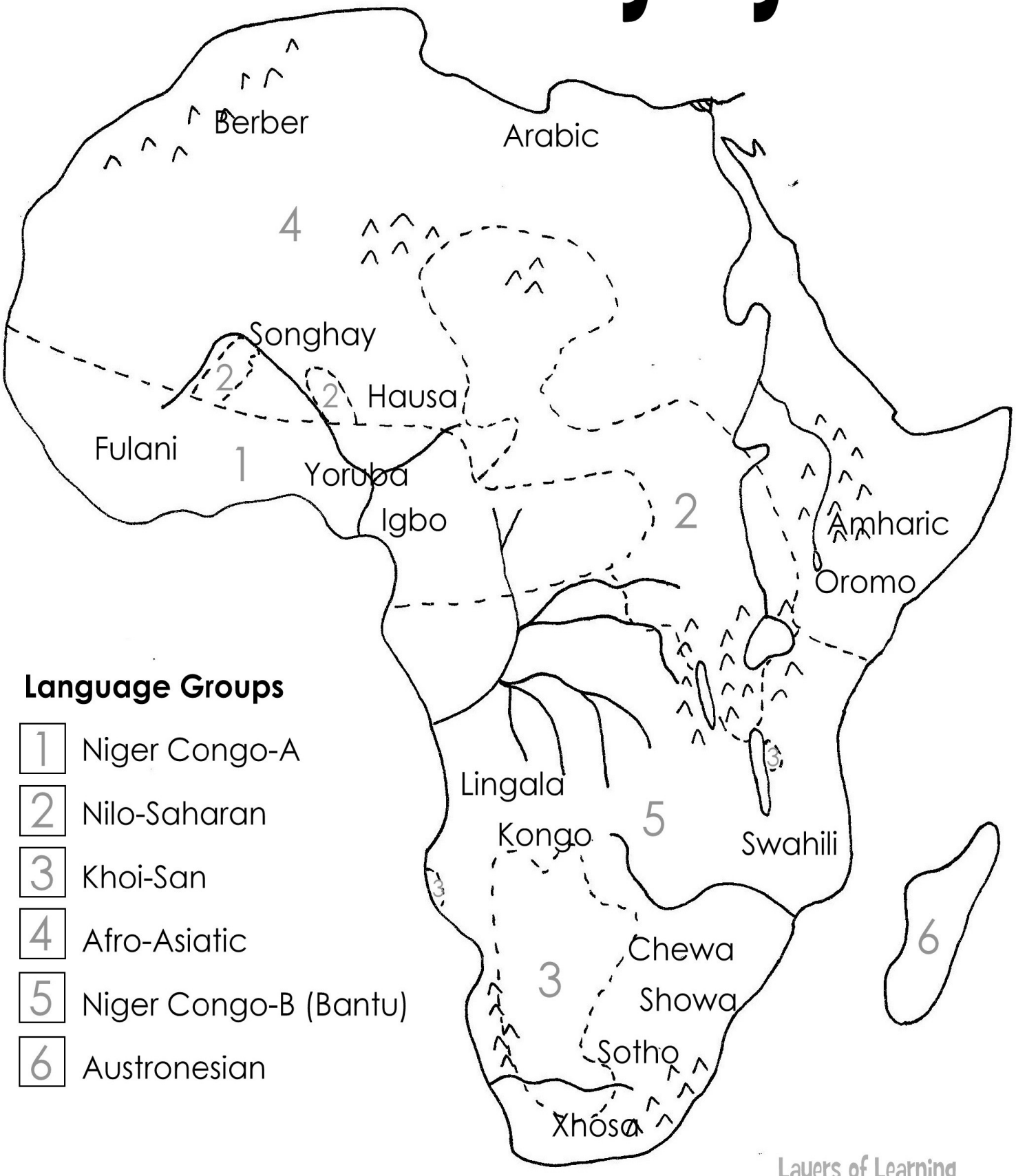


Sahara Trade Routes



Donkey pack trains were used in the caravans. Camels were not domesticated until nearly a thousand years later.

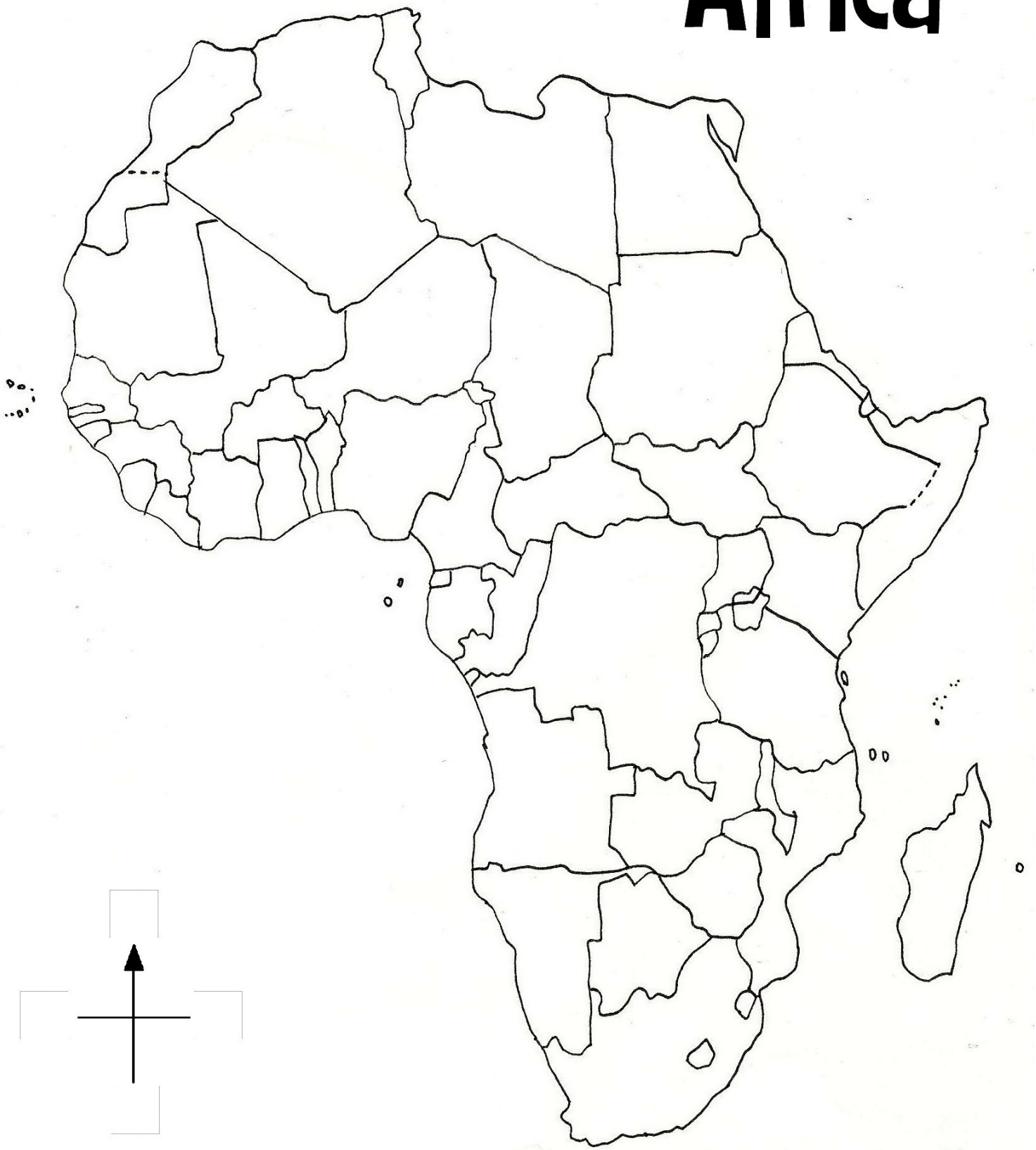
African Languages



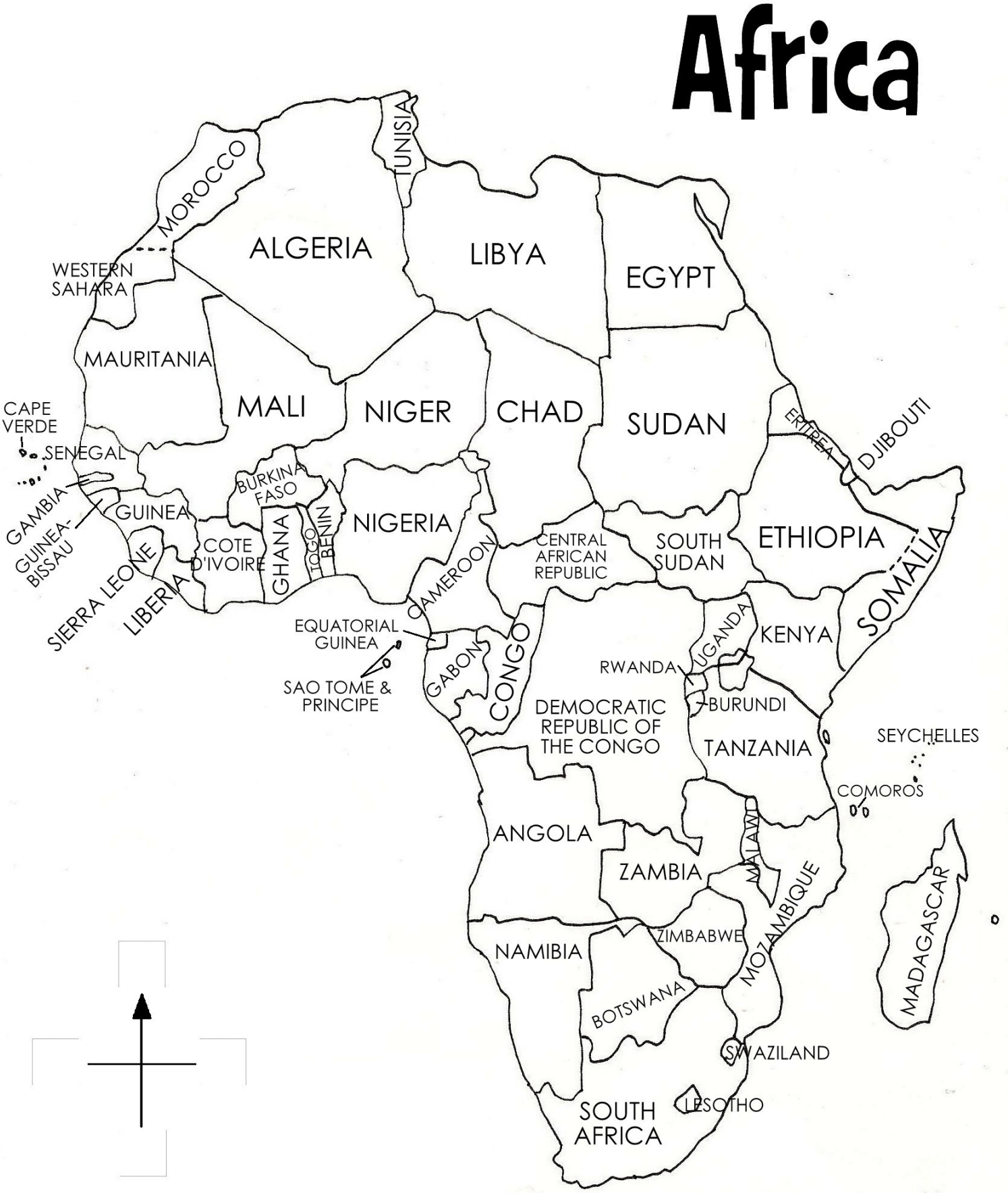
Language Groups

1. Niger Congo-A
2. Nilo-Saharan
3. Khoi-San
4. Afro-Asiatic
5. Niger Congo-B (Bantu)
6. Austronesian

Africa

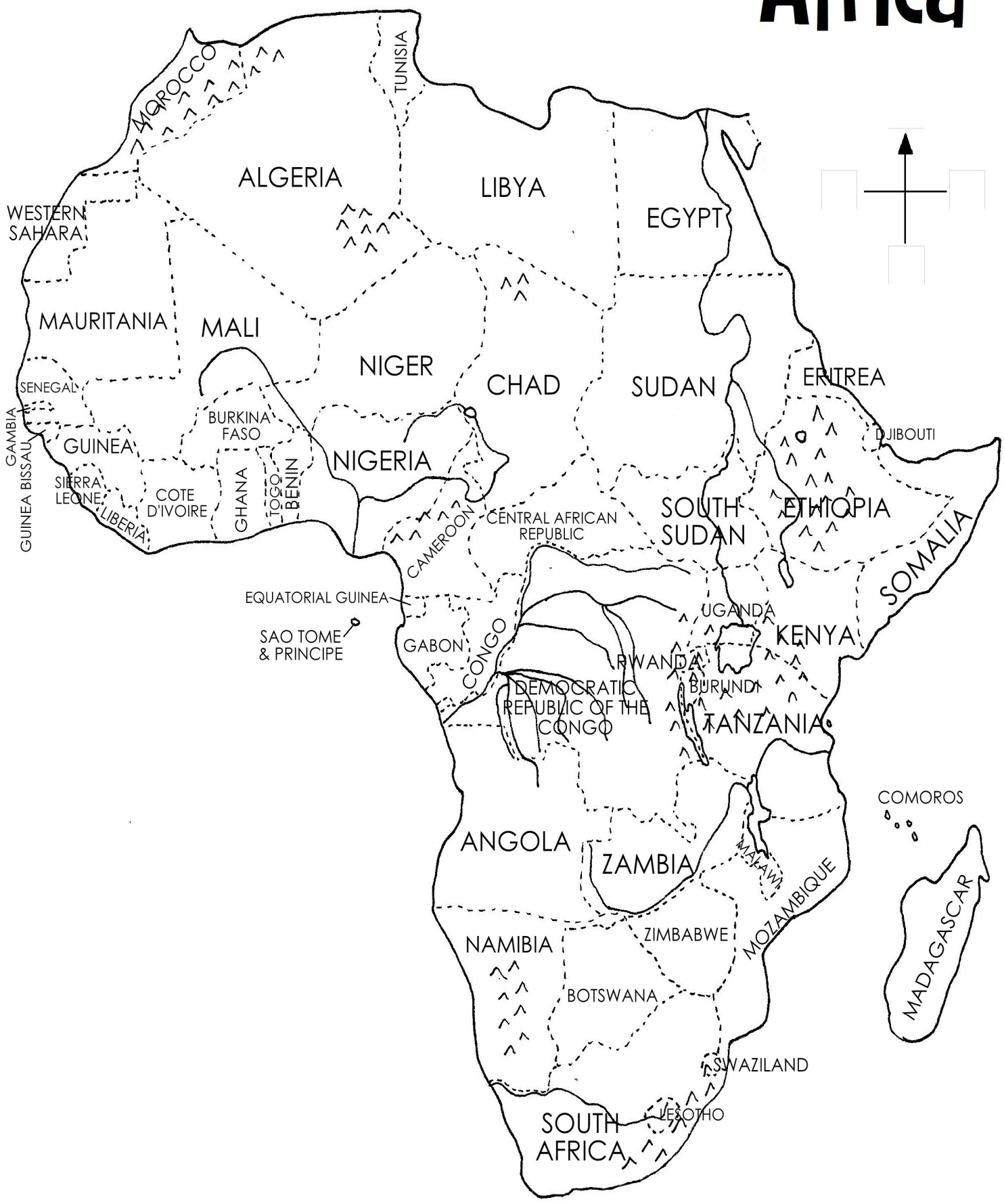


Africa

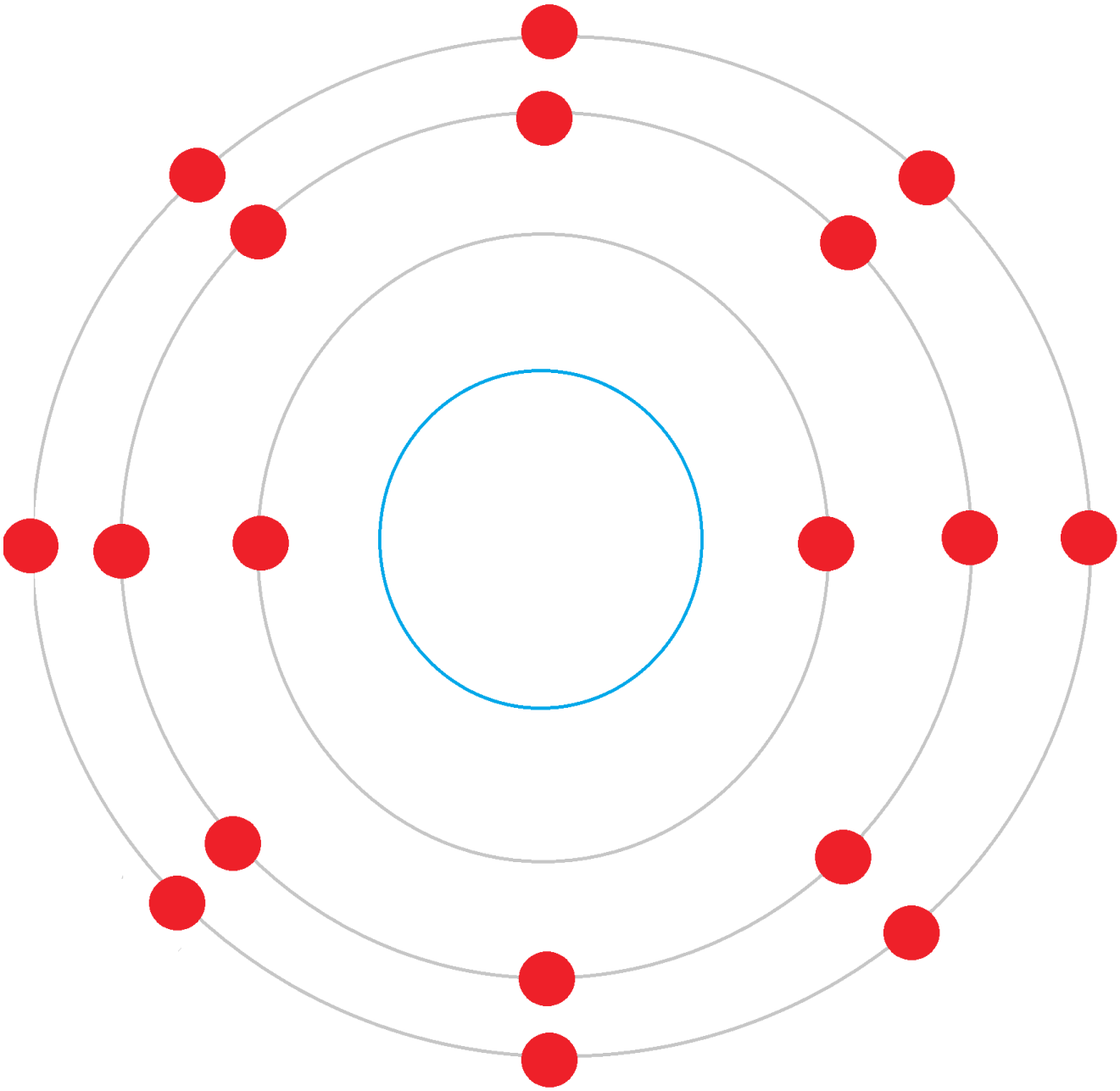


Africa

Africa


MOROCCO
TUNISIA
ALGERIA
LIBYA
EGYPT
WESTERN SAHARA
MAURITANIA
MALI
NIGER
CHAD
SUDAN
ERITREA
SENEGAL
GAMBIA
GUINEA BISSAU
GUINEA
BURKINA FASO
NIGERIA
DJIBOUTI
SIERRA LEONE
LIBERIA
COTE D'IVOIRE
GHANA
TOGO
BENIN
CAMEROON
CENTRAL AFRICAN REPUBLIC
SOUTH SUDAN
ETHIOPIA
SOMALIA
EQUATORIAL GUINEA
SAO TOME & PRINCIPE
GABON
CONGO
UGANDA
KENYA
RWANDA
BURUNDI
DEMOCRATIC REPUBLIC OF THE CONGO
TANZANIA
COMOROS
ANGOLA
ZAMBIA
MALAWI
MOZAMBIQUE
MADAGASCAR
NAMIBIA
ZIMBABWE
BOTSWANA
SWAZILAND
LESOTHO
SOUTH AFRICA

Electron Configuration Worksheet



Choose an element from the first three periods of the periodic table and use the periodic table to determine how many electrons, neutrons, and protons it has. Use colored mini marshmallows to fill in the proper space on the diagram. For example for carbon you would place six pink marshmallows in the center to represent protons, six yellow in the center to represent neutrons and six green on the red electron spaces to represent the electrons. The inner rings are always filled before the outer rings.

Periodic Table of the Elements

The number of valence electrons for each group is shown at the top of the column for that group. The valence electrons are the number of electrons available for bonding.

The metals in this center section have a "d" orbital on the highest energy level. This makes them behave differently from the numbered columns above, which have "s" or "p" orbitals on their upper energy levels. Because of this we won't use the metals in Lewis dot diagrams or in bonding excercises.

1	2	3	4	5	6	7	8
1 H Hydrogen 1.0							2 He Helium 4.0
3 Li Lithium 6.9	4 Be Beryllium 9.0	5 B Boron 10.8	6 C Carbon 12.0	7 N Nitrogen 14.0	8 O Oxygen 16.0	9 F Fluorine 19.0	10 Ne Neon 20.2
11 Na Sodium 23.0	12 Mg Magnesium 24.3	13 Al Aluminum 27.0	14 Si Silicon 28.1	15 P Phosphorus 31.0	16 S Sulfur 32.1	17 Cl Chlorine 35.5	18 Ar Argon 40.0
19 K Potassium 39.1	20 Ca Calcium 40.1	21 Sc Scandium 45.0	22 Ti Titanium 47.9	23 V Vanadium 50.9	24 Cr Chromium 52.0	25 Mn Manganese 54.9	26 Fe Iron 55.9	27 Co Cobalt 58.9	28 Ni Nickel 58.7	29 Cu Copper 63.5	30 Zn Zinc 65.4	31 Ga Gallium 69.7	32 Ge Germanium 72.6	33 As Arsenic 74.9	34 Se Selenium 79.0	35 Br Bromine 79.9	36 Kr Krypton 83.8
37 Rb Rubidium 85.5	38 Sr Strontium 87.6	39 Y Yttrium 88.9	40 Zr Zirconium 91.2	41 Nb Niobium 92.9	42 Mo Molybdenum 95.9	43 Tc Technetium 99	44 Ru Ruthenium 101.0	45 Rh Rhodium 102.9	46 Pd Palladium 106.4	47 Ag Silver 107.9	48 Cd Cadmium 112.4	49 In Indium 114.8	50 Sn Tin 118.7	51 Sb Antimony 121.8	52 Te Tellurium 127.6	53 I Iodine 126.9	54 Xe Xenon 131.3
55 Cs Cesium 132.9	56 Ba Barium 137.3	Lanthinides 57-71	72 Hf Hafnium 178.5	73 Ta Tantalum 180.9	74 W Tungsten 183.9	75 Re Rhenium 186.2	76 Os Osmium 190.2	77 Ir Iridium 192.2	78 Pt Platinum 195.1	79 Au Gold 197.0	80 Hg Mercury 200.6	81 Ti Thallium 204.4	82 Pb Lead 207.2	83 Bi Bismuth 209.0	84 Po Polonium 210.0	85 At Astatine 211	86 Rn Radon 222.0
87 Fr Francium 223.0	88 Ra Radium 226.0	Actinides 89-103	104 Rf Rutherfordium 267	105 Db Dubnium 268	106 Sg Seaborgium 271	107 Bh Bohrium 272	108 Hs Hassium 270	109 Mt Meitnerium 276	110 Ds Darmstadtium 281	111 Rg Roentgenium 280	112 Cn Copernicium 235	113 Uut Ununtrium 284	114 Fl Flerovium 289	115 Uup Ununpentium 288	116 Lv Livermorium 293	117 Uus Ununseptium 294	118 Uuo Ununoctium 294

57 La Lanthanum 138.9	58 Ce Cerium 140.1	59 Pr Praseodymium 140.9	60 Nd Neodymium 144.2	61 Pm Promethium 145	62 Sm Samarium 150.4	63 Eu Europium 152.0	64 Gd Gadolinium 157.3	65 Tb Terbium 158.9	66 Dy Dysprosium 162.5	67 Ho Holmium 164.0	68 Er Erbium 167.3	69 Tm Thulium 168.9	70 Yb Ytterbium 173.0	71 Lu Lutetium 175.0
89 Ac Actinium 227.0	90 Th Thorium 232.0	91 Pa Protactinium 231.0	92 U Uranium 238.0	93 Np Neptunium 237	94 Pu Plutonium 242	95 Am Americium 243	96 Cm Curium 247	97 Bk Berkelium 247	98 Cf Californium 251	99 Es Einsteinium 254	100 Fm Fermium 253	101 Cf Mendelevium 256	102 No Nobelium 254	103 Lr Lawrencium 257

Lewis Dots For Individual Atoms

Use the Periodic Table to find the number of Valence Electrons each element has. Put dots around the chemical symbol, one to a side, then two to a side until the electrons are used up. How many blank spaces are left? How many more electrons does each element need to have a full octet?

He	Ga	Na
C	Po	N
K	F	O
Ba	As	I

Lewis Dots For Individual Atoms

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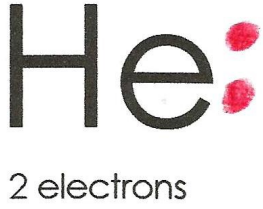
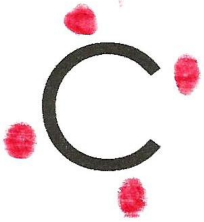
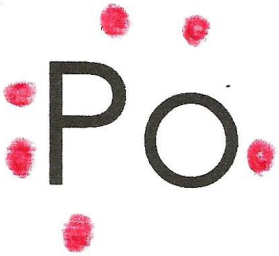


2 electrons

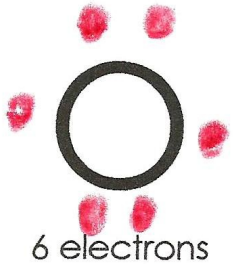
Helium has only an "s" orbital so it is full and stable with only two valence electrons.

3 electrons

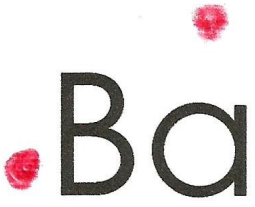




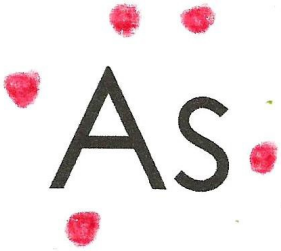
7 electrons

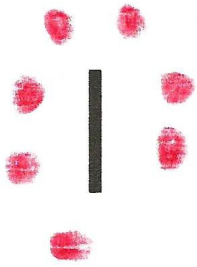


6 electrons



2 electrons



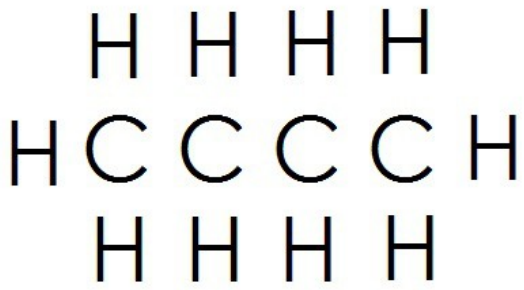


Lewis Dot Diagrams

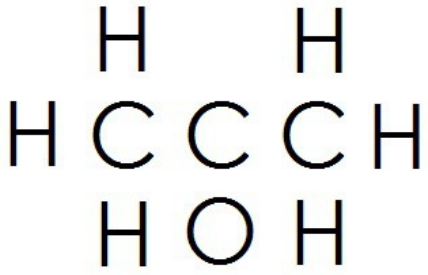
Complete the Lewis Dot Diagrams for the bonds between these molecules. Color code the dots to match each type of molecule.

1. Hydrogen Chloride (HCl)

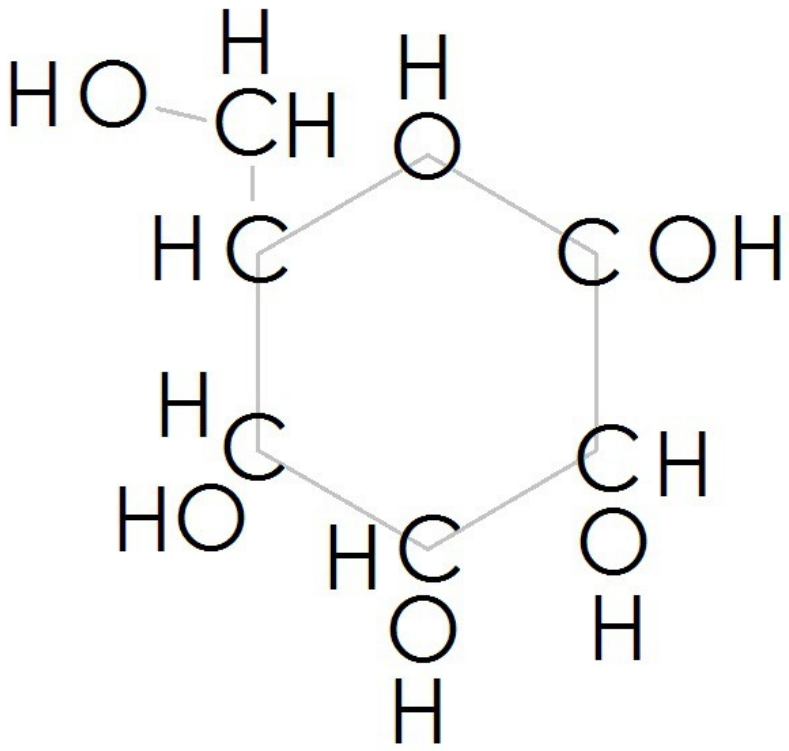
2. Butane (C_4H_{10})



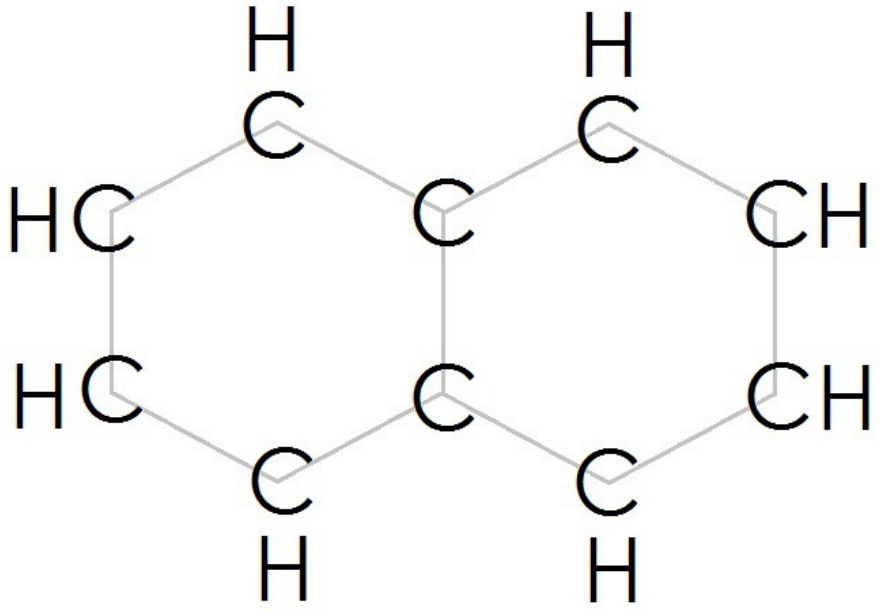
3. Acetone (CH_3COCH_3)



4. Glucose ($C_6H_{12}O_6$)



5. Napthalene ($C_{10}H_8$)



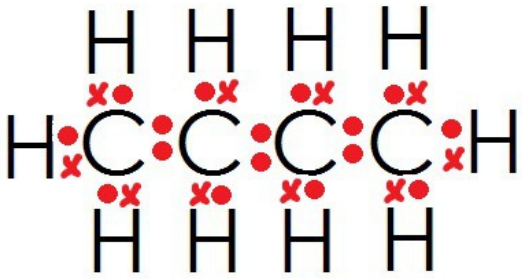
Lewis Dot Diagrams Answers

Here are the answers to the Lewis Dot Diagram worksheet with some explanations.

1. Hydrogen Chloride (HCl)

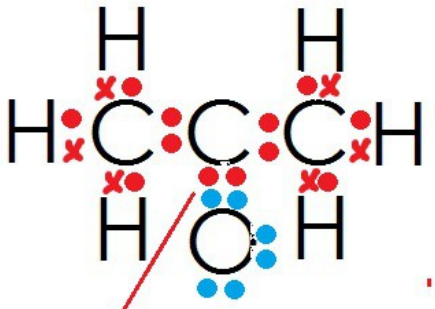
Hydrogen has one valence electron and wants two to be filled. Chlorine has seven valence electrons and wants eight to be filled.

2. Butane (C_4H_{10})



Carbon has four valence electrons. It often pairs with hydrogen to make long chains.

3. Acetone (CH_3COCH_3)

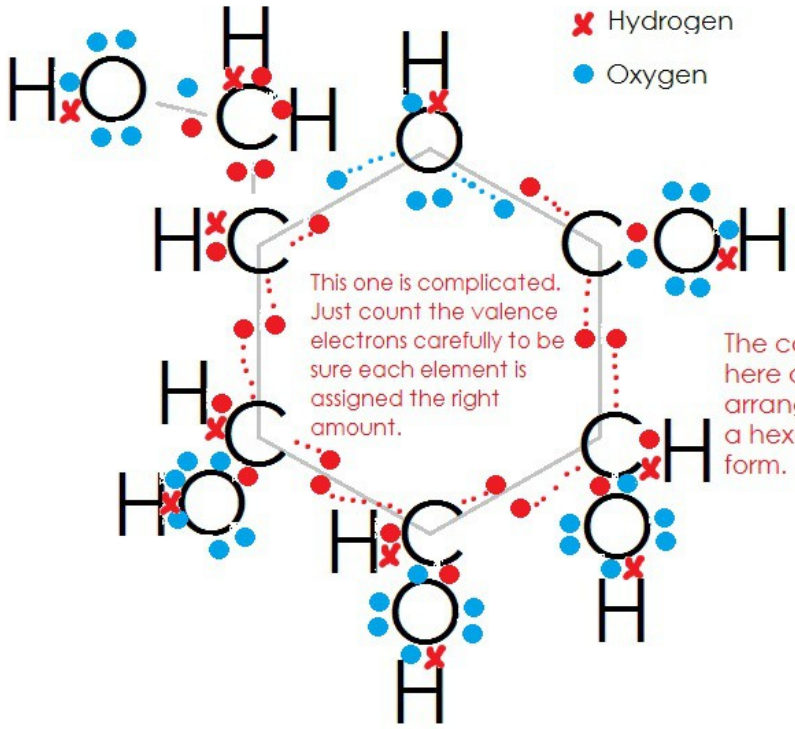


Oxygen and carbon form a double bond here, each contributing two electrons.

4. Glucose ($C_6H_{12}O_6$)

We assigned our elements each a symbol/color:

- Carbon
- Hydrogen
- Oxygen

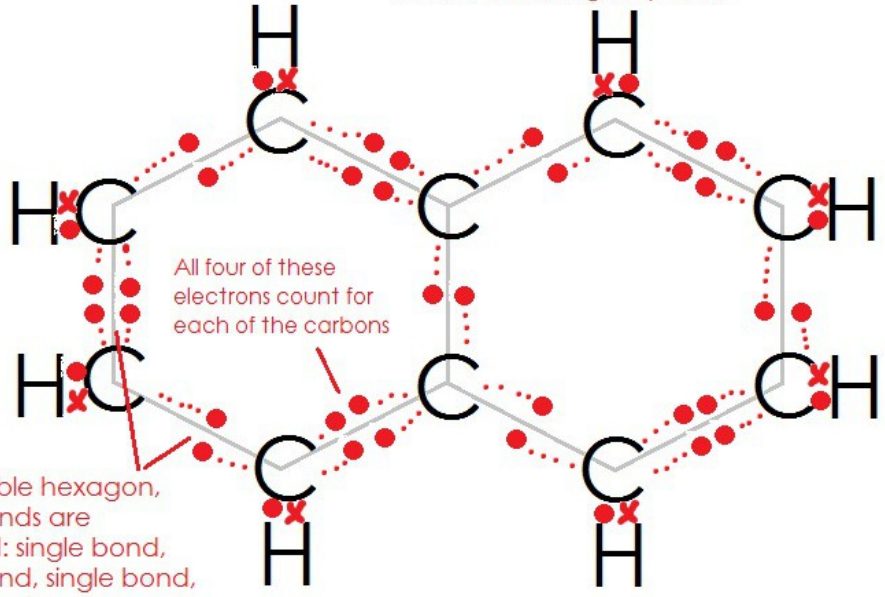


This one is complicated. Just count the valence electrons carefully to be sure each element is assigned the right amount.

The carbons here are arranged in a hexagonal form.

5. Napthalene ($C_{10}H_8$)

Double bonds (and triple bonds) are always shared equally. An element will never give up three electrons while the other is donating only one.



All four of these electrons count for each of the carbons

In this double hexagon, double bonds are alternated: single bond, double bond, single bond, double bond . . .

Hydrogens are super versatile, having one electron and needing only one electron.