Name: _____

ARCC Final Review Videos

Significant Digits
http://www.youtube.com/watch?v=8Tr2PZG8I5c

After watching the description of the rules, determine the number of significant digits for the following numbers. Check your answers by watching the rest of the video.

1. 12 _____
2. 012 _____
3. 0012_____
4. 120 _____
5. 1200 _____
6. 1200. _____
7. 7001 _____
8. 70010 _____
9. 70010. _____

Measurement and Significant Digits
http://www.youtube.com/watch?v=deLzHioCiiA

1. What is a "certain digit"?
2. What is an "uncertain digit"?
3. After watching the first example, stop the video. Determine the measurement of the water in the buret. Check your answer by continuing the video.

Precision vs. Accuracy
http://www.youtube.com/watch?v=_LL0uiOgh1E

1. What does it mean to be precise?
2. What does it mean to be accurate?
3. Three lab groups measure the mass of a penny. The U.S. Mint states that every penny has a mass of 2.500g. Determine which sets of data are accurate, precise, and accurate and precise.

Data Set 1	Data Set 2	Data Set 3
2.000, 2.125, 2.100	2.500, 2.499, 2.501	2.500, 2.000, 3.000

Unit Conversion
http://www.youtube.com/watch?v=XKCZn5MLKvk

After watching the first example, convert 200 lbs to kg below. Hint: 1 kg = 2.2 lbs.

Check your answer by watching the rest of the video.

Formula Writing for Ionic Compounds
http://www.youtube.com/watch?v=bPoxAdcYIHU

After watching the first example, write the formulas for the following.

1. calcium fluoride _____
2. ammonium carbonate _____
3. aluminum sulfate _____

Naming Ionic Compounds
http://www.youtube.com/watch?v=7Lfc6jjp1WQ

After watching the first example, write the names for the following.

1. Ag_2S _____
2. $Mg(NO_3)_2$ _____
3. $CuSO_4$ _____

Naming & Formula Writing for Covalent Compounds
http://www.youtube.com/watch?v=1VRiHpkk7mc
After watching the first example for naming, write the names for the following.

1. CO_2 _____
2. C_2O _____
3. C_3O_4 _____

After watching the first example for writing the formula from the name, write the formulas for the following.

1. N_2O_5 _____
2. NH_3 _____
3. PCl_6 _____

Naming Acids and Bases
http://www.youtube.com/watch?v=u6EbuJbuRyk

1. What element is always in an acid?
2. What polyatomic ion is always in a base?
3. Name the following compounds.
    a. H_2S _____
    b. H_2SO_4 _____
    c. H_2SO_3 _____
    d. $Fe(OH)_2$ _____
    e. NH_4OH _____
    f. $NaOH$ _____

Density
http://www.youtube.com/watch?v=xxV7myJ0PA0
Stop the video when you get to the glasses of water and olive oil.

1. Predict which substance will float on the other. Explain your answer using the words mass, volume, and density.

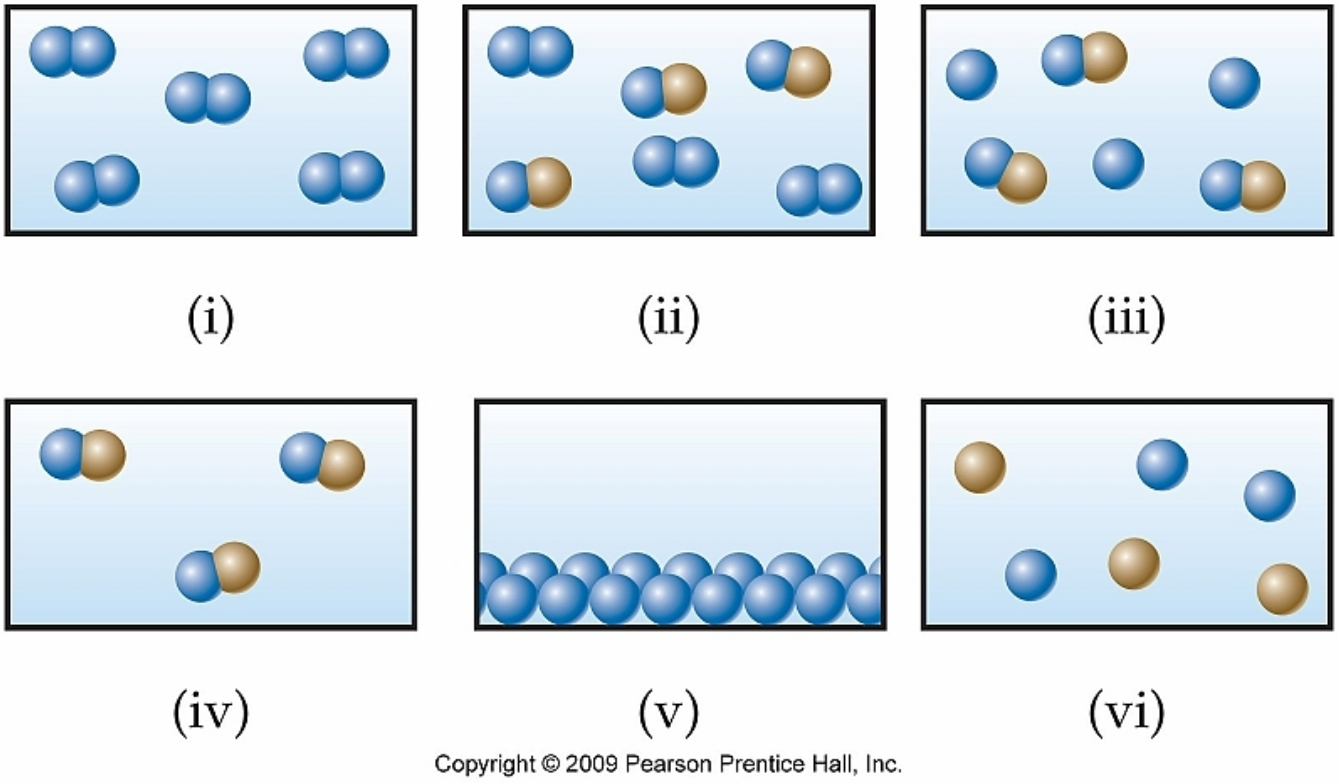
Physical Change and Chemical Change
http://www.youtube.com/watch?v=gCbqjs-pqJo

1. What is the difference between a physical change and a chemical change?
2. Circle the changes below that are chemical changes.

Eating	Ripping up paper
Freezing water	Rusting

Mixtures and Pure Substances
http://www.youtube.com/watch?v=if2fVBqSVm8

1. What is the difference between a pure substance and a mixture?
2. Looking at the pictures below, classify each picture as a pure element, pure compound or mixture.



Types of Reactions
http://www.youtube.com/watch?v=Ym1ln3LG46k
Stop the video after the first example. Determine the type of reaction for the following reactions.

1. Potassium carbonate →
2. butane + oxygen →
3. sodium iodide + bromide →
4. hydrogen + chlorine →

Neutralization Reactions
http://www.youtube.com/watch?v=gRKS4BkuYEA

1. How are neutralization reactions similar to double displacement reactions?

2. How are neutralization reactions different from double displacement reactions?

3. What two products are always formed in a neutralization reaction?
4. Stop the video at time 3:38. Do the practice problems below. Check your answers by watching the rest of the video.
    a. $H_3PO_4 + Sr(OH)_2$ →
    b. $Ba(OH)_2 + HF$ →
    c. $H_2SO_4 + Ca(OH)_2$ →
    d. $HCl + Al(OH)_3$ →

Precipitation Reactions and Solubility Rules
http://www.youtube.com/watch?v=lnpFtXj1mUE

1. Write the products and determine if the products are going to be solid or aqueous.
$$AgNO_3 + NaBr \rightarrow$$

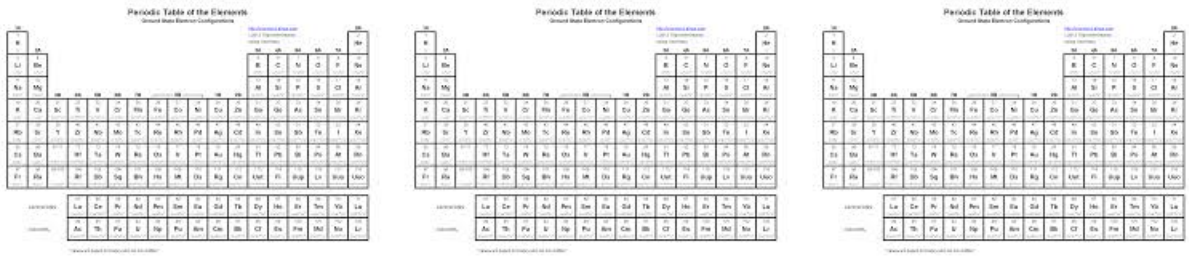
2. Write the products and determine if the products are going to be solid or aqueous.
$$Na_2SO_4 + KCl \rightarrow$$

Net Ionic Equations
http://www.youtube.com/watch?v=MeSi3dDOL2I
Write the net ionic equation for the following chemical reaction.
$$AlCl_3 + NaOH \rightarrow Al(OH)_3 + NaCl$$

Periodic Table Trends

http://www.youtube.com/watch?v=G3qbooMh6Fc

1. Draw the trends for atomic radii, ionization energy, and electronegativity on the period tables below.



2. Consider phosphorus and its neighbors nitrogen, silicon, arsenic, and sulfur.
    a. Which element above has a greater electronegativity than phosphorus?
    b. Which element has a larger atomic radius than phosphorus?
    c. Which element has a greater ionization energy than phosphorus?

Empirical and Molecular Formulas

http://www.youtube.com/watch?v=AFqwtY7m2PI

1. What is the difference between an empirical formula and a molecular formula?

2. Stop the video about at time 5:07. Determine the empirical and molecular formulas for oxalic acid below. Check your answer by watching the rest of the video.

Oxidation Numbers

http://www.youtube.com/watch?v=8_CvNPuuhiM

Stop the video at time 5:10. Determine the oxidation numbers for each element in the following compounds and ions.

1. $KMnO_4$ _____
2. SO_4^{-2} _____
3. KH _____

Evidence of a Reaction

http://www.youtube.com/watch?v=cZMkqagL8Ps

List the six factors that are evidence of a chemical reaction.

Balancing Equations

http://www.youtube.com/watch?v=UGf60kq_ZDI

After watching the first example, stop the video. Balance the following equations.

1. ___ P_4O_{10} + ____ H_2O → ____ H_3PO_4

Stoichiometry

Watch http://www.youtube.com/watch?v=SjQG3rKSZUQ for a Khan Academy lesson.

Watch http://www.youtube.com/watch?v=wySZDEbqbnM for practice problems.

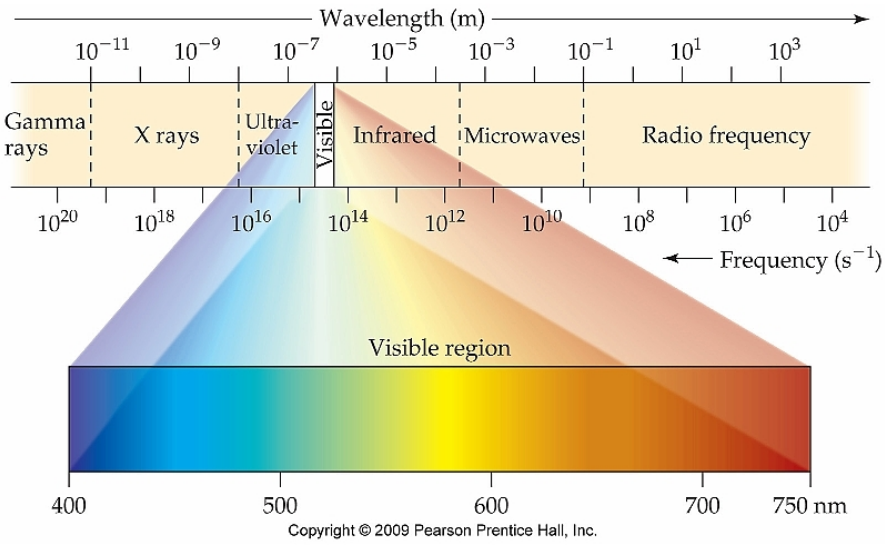
After watching the first example on the 2nd video, stop the video and try the following problems.

1. What is the mass of Fe produced if 8.75 g of Fe_2O_3 is reacted completely according to the following equation?

$$Fe_2O_3 + 3CO \rightarrow 2\ Fe + 3\ CO_2$$

Electromagnetic Spectrum

http://www.youtube.com/watch?v=cfXzwh3KadE



1. Using the diagram above, which type of wave has the highest energy?
2. Using the diagram above, which color of visible light has the lowest energy?

Electron Configuration

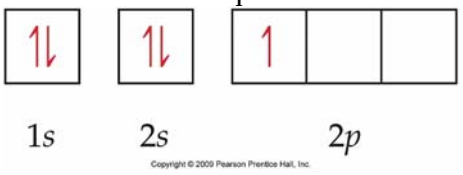
http://www.youtube.com/watch?v=JNPFR-22MPA

1. In the electron configuration $1s^2$, what does the 1 mean? What does the 2 mean?
2. Write the electron configuration for Cl.

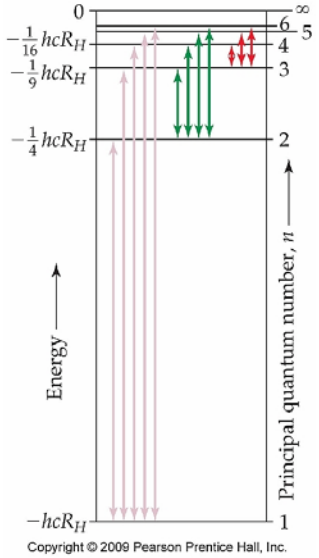
Quantum Numbers

http://www.youtube.com/watch?v=_sCJsoXh78Y

1. Write out the quantum numbers for each of the electrons shown in the diagram below.



2. Using the graphic below, determine which electron transitions result in the highest energy emission and the lowest energy emission.



Atomic Structure

http://www.youtube.com/watch?v=JUYOg72xrCM

1. In a neutral atom, the number of protons _____ the number of electrons.
2. Fill in the table below.

Element	Protons	Neutrons	Electrons	Mass number
Ca				
	14			
	52			

3. What is an ion?

4. What is an isotope?

Lewis Dot Structures and Resonance Structures
http://www.youtube.com/watch?v=PtMifU1py5I

VSEPR Theory and Bond Shapes
http://www.youtube.com/watch?v=keHS-CASZfc

Hybridization and sigma (σ) and pi (π) bonds
For hybridization: http://www.youtube.com/watch?v=mTHW9W-2-N8
For sigma (σ) and pi (π) bonds: http://www.youtube.com/watch?v=uA8nlDSdeyc

Bond and Molecular Polarity
http://www.youtube.com/watch?v=eJgb2fVCyaQ

Gas Laws
http://www.youtube.com/watch?v=UKUmYU6Q1cA

Phase Transition Graphs
http://www.youtube.com/watch?v=sqkS9_MxRVU

Thermochemistry
Enthalpy (ΔH): http://www.youtube.com/watch?v=KCQALFuAZOc

1. What is enthalpy?
2. If ΔH is positive, the reaction is endothermic or exothermic?
3. If ΔH is negative, the reaction is endothermic or exothermic?

Entropy (ΔS): http://www.youtube.com/watch?v=RwQjNViBinE

1. What is entropy?
2. Which phase has more entropy; solid, liquid or gas?

Gibbs Free Energy (ΔG): http://www.youtube.com/watch?v=DPjMPeU5OeM

1. What is the equation to calculate Gibbs Free Energy?
2. When $\Delta G < 0$, the reaction is spontaneous or non-spontaneous?
3. When $\Delta G > 0$, the reaction is spontaneous or non-spontaneous?

For an example of how to calculate ΔG, http://www.youtube.com/watch?v=sG1ZAdYi13A