Name_____ **Date**_____

ELECTROLYTES

1. Describe what an ion is. Draw one diagram of a *negative ion* and one diagram of a *positive ion.(pages 42-44 textbook)* (3p)

2. Fill in the table with information pertaining to the characteristics of ions: (3p)

Negative ion	Positive ion

3. Explain what an electrolyte is and give one example: *(page 55 textbook)* (2p)

4. Explain what the ion dissociation(ion dissolution) is: *(page 55 textbook)* (2p)

5. Use your notes and page 58 in the textbook to describe "acids": (5p)

Definition: (2p)	
Formula and examples (1p)	
Litmus paper reaction (1p)	
Neutralization	Neutralize bases
Properties	Sour in taste, kill germs
pH range (1p)	

6. Use your notes and page 58 in the textbook to describe "bases": (5p)

Definition: (2p)	
Formula and examples (1p)	
Litmus paper reaction (1p)	
Neutralization	Neutralize acids
Properties	Bitter in taste, slippery to the touch, dissolve fats
pH range (1p)	

7. Use your notes and page 59 in the textbook to describe "salts" and their chemical formula: (5p)

Definition: (2p)	
Formula and examples (1p)	
Litmus paper reaction (1p)	
Neutralization	Product of neutralization
Properties	Salty in taste, enhance food taste
pH range (1p)	

8. Explain why acids, salts and bases conduct electricity. (2p)

9. Determine the type of substance for the following compounds (write the word *acid*, *salt* or *base* next to the chemical formula provided). Remember that chemical formulas of acids begin with H, chemical formulas of bases end in OH and salts are made up of a metal and a non metal. (6p)

1. HCl _____
2. BeS _____
3. $Be(OH)_2$_____
4. HBr_____
5. NaOH_____
6. NaBr_____
7. HI_____
8. LiOH _____
9. MgI_2_____
10. KOH_____
11. HF_____
12. $Mg(OH)_2$ _____

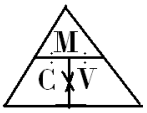
10. You are given a powdered solid, a beaker, distilled water, an electrical conductivity tester and litmus paper. It is presumed that the solid is a neutral salt. How would you go about confirming that the solid is a neutral salt? Design an experiment for this purpose and specify the expected results.

(5p)

Name_____ **Date**_____

THE CONCENTRATION IN GRAMS/LITRE

mass = CV	C = concentration in g/L V = volume in L



$$\%\frac{m}{V} = \frac{grams\ of solute}{100mL\ of\ solution}$$

Example 1: If 30 grams of NaOH are dissolved and then diluted to 2.0 L with water, ***what is the concentration of the solution? Express the concentration in % m/V.***

Given:	**Solution:**
Required:	**Answer:**

Example 2: ***What mass of salt is needed to make 300 mL of a 2 g/L solution? Express the concentration in % m/V.***

Given:	**Solution:**
Required:	**Answer:**

Example 3: ***What is the volume of a solution with a concentration of 50g/L , for which we are using 10 grams of solute? Express the concentration in % m/V.***

Given:	**Solution:**
Required:	**Answer:**

PRACTICE:

1. Find the concentration for each of the following:

	in g/L	**%m/V**
20 g of NaCl dissolved in 5 L of solution		
2.8 g of NaBr dissolved in 200 mL of solution		

200 mg of KCl dissolved in 75 mL of solution		
0.001 kg of solute in 50 mL of solution		
20 grams of solute in 100 mL of solution		
100 mg of solute in 0.1 L of solution		
250 mg of solute in 0.250 L of solution		

2. How many grams of Br_2 are needed to make 250 mL of a 4.5 g/L solution?

Given:	**Solution:**
Required:	**Answer:**

3. How many grams of HCl are needed to make 500 mL of a 2 g/L solution?

Given:	**Solution:**
Required:	**Answer:**

4. How many grams of LIF are needed to make 2.0 L of a 5 g/L solution?

Given:	**Solution:**
Required:	**Answer:**

5. ***Calculate the volume of salt solution solution of a 20g/L concentration in which we dissolved 50 g of salt.***

Given:	**Solution:**
Required:	**Answer:**

6. Calculate the volume of sugar solution of a 50g/L concentration in which we dissolved 100 g of sugar.

Given:	**Solution:**
Required:	**Answer:**

*7. **How many grams of HNO_3 are needed to make 300 mL of a 10 g/L solution?***

Given:	**Solution:**
Required:	**Answer:**

8. What volume of solution would you prepare if you dissolved 50g of solute and made a 10 g/L solution?

Given:	**Solution:**
Required:	**Answer:**

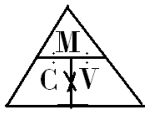
9. You prepared an aqueous solution of sodium hydroxide, NaOH, that has a concentration of 45 g/L. To do this, you used 100 g of NaOH. ***What is the volume of the solution you prepared?***

Given:	**Solution:**
Required:	**Answer:**

Name_____ **Date**_____

THE CONCENTRATION IN % MASS/VOLUME

mass = CV **C = concentration in g/L**
V = volume in L



$$\%\frac{m}{V} = \frac{grams\ of\ solute}{100mL\ of\ solution}$$

Find the concentration for each of the following:

	in g/L	**%m/V**
20 g of NaCl dissolved in 5 L of solution		
2.8 g of NaBr dissolved in 200 mL of solution		
200 mg of KCl dissolved in 75 mL of solution		
0.001 kg of solute in 50 mL of solution		

20 grams of solute in 100 mL of solution		
100 mg of solute in 0.1 L of solution		
250 mg of solute in 0.250 L of solution		
150 mg of solute in 150 mL of solution		
70 mg of solute in 140 mL of solution		

Name_____ **Date**_____

THE CONCENTRATION IN PARTS PER MILLION

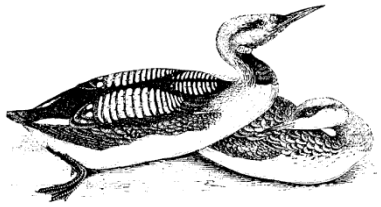
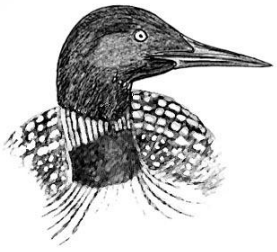
Mark_____/

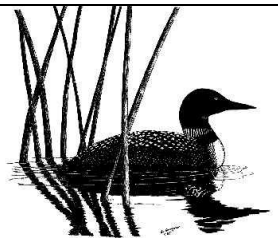
WE USE ppm FOR VERY SMALL CONCENTRATIONS!

$$\text{Concentration}_{(\text{ppm})} = \frac{\text{amount of solute}}{\text{amount of solution}} = \frac{\text{number of parts of solute}}{\text{one million parts of solution}}$$

$$1\,\text{ppm} = \frac{1\,\text{mg of solute}}{1\,000\,000\ \text{mg of solution}} = \frac{1\,\text{mg}}{1\,\text{kg}}$$

Ex: Blood samples were taken from four loons in northern Quebec and analyzed for their mercury (Hg) content. When the concentration of mercury exceeds 5 ppm, loons have problems breeding.

Loon	Mass of mercury in sample	Mass of blood sample	Calculation
 A	3.0 mg	100 g	
 B	0.0003 g	100 g	

 C	0.020 g	1.0 kg	
 D	0.2 mg	10 kg	

Use the above table to arrange the samples in increasing order of concentration and determine which loons could experience reproductive problems.

The lowest concentration appears in loon _____

The highest appears in loon_____

The loon(s) which could develop reproductive problems include(s)_____

Name_____ **Date**_____

THE CONCENTRATION IN PARTS PER MILLION

Conversions practice

Mark_____/

$$\text{Concentration}_{(\text{ppm})} = \frac{\text{amount of solute}}{\text{amount of solution}} = \frac{\text{number of parts of solute}}{\text{one million parts of solution}}$$

$$\text{ppm} = \text{parts per million} = \frac{\text{mg}}{\text{kg}}$$

In aqueous solutions the solvent is water, and since the mass of 1 L of water is 1000g (1kg), the concentration in parts per million can be expressed as:

$$C_{(\text{ppm})} = \frac{\text{mg}}{\text{L}}$$

CONVERT THE FOLLOWING CONCENTRATIONS TO ppm:

1	0.00002% (m/V)	
2	0.0004% (m/V)	
3	0.0004 g/L	
4	0.0058 g/L	

5	0.0008% (m/V)	
6	0.000066% (m/V)	
7	0.0004 g/L	
8	5 g/L	
9	0.09% (m/V)	
10	0.003% (m/V)	
11	40 g/L	
12	0.0024 g/L	

Name_____ **Date**_____

MORE CONVERSIONS PRACTICE ON CONCENTRATION

Mark_____/

$$C(g/L) = \frac{m(g)}{V(L)} \qquad C(\%m/V) = \frac{g}{100mL} \qquad C(ppm) = \frac{mg}{L} = \frac{mg}{kg}$$

FILL IN THE TABLE WITH THE MISSING VALUES OF THE CONCENTRATION:

	grams per litre	% m/V	ppm
1		0.04% (m/V)	
2	29 g/L		
3			14 ppm
4	0.065 g/L		
5		15 % (m/V)	

6			3200 ppm
7	0.009 g/L		
8		0.0029% (m/V)	
9			450 ppm
10	24 g/L		
11		15%m/V	
12			2900 ppm

Mark: ___/51

CONCENTRATION PRACTICE

Test Review

CONVERSIONS:

1. ***Convert the following into Kg:*** **___/3**

Unit	**450 g**	**3642 mg**	**0.3 g**
Conversion			
Solutions			

2. ***Convert the following into g:*** **___/3**

Unit	**4.7 Kg**	**784 mg**	**0.04 Kg**
Conversion			
Solutions			

3. ***Convert the following into mg:*** **___/3**

Unit	**6.9 Kg**	**634 g**	**0.07 g**
Conversion			
Solutions			

***4. Convert the following into L*:** **___/3**

Unit	**356 mL**	**56,768 mL**	**12 mL**
Conversion			
Solutions			

5. ***Convert the following into mL:*** **___/3**

Unit	**400L**	**6.4 L**	**0.067 L**
Conversion			
Solutions			

CONCENTRATION IN GRAMS PER LITRE (g/L)

1. 450 g of NaCl is dissolved in water to create a 540 mL solution. ***What is the concentration in g/L?*** **___/3**

Show Work:

Solution: _____

2. 4 Kg of NaOH is dissolved in water to create a 250 L solution. ***What is the concentration in g/L?*** **__/3**

Show Work:

Solution: _____

3. A solution with a concentration of 4.6 g/L has a volume of 65 L. ***How many grams of NaCl were used to make this solution?***

Show Work: **___/3**

Solution: _____

4. 0.05 Kg of NaOH was dissolved in water to make a solution with a concentration of 15g/L. ***What is the volume in mL of this solution?*** **___/3**

Show Work:

Solution: _____

CONCENTRATION IN PERCENT MASS/VOLUME (%m/V)

(Remember to convert calculations to: 1g/100 mL)

1. 60 g of AgCl is dissolved in water to create a 300 mL solution. ***What is the concentration of this solution in %m/V ?*** ___/3

Show Work: Solution: _____

2. 0.5 Kg of $Mg(OH)_2$ is dissolved in water to create a 8L solution. ***What is the concentration of this solution in %m/V ?*** ___/3

Show Work: Solution: _____

3. A 15%m/V solution was made using 540 g of NaOH. ***What is the volume of this solution in mL ?*** ___/3

Show Work: Solution: _____

4. A 8% m/V solution has a volume of 5 L. ***What mass (in grams) of KCl was used to make this solution?*** ___/3

Show Work: Solution: _____

CONCENTRATION IN PARTS PER MILLION(ppm)

Remember to convert calculations to: 1(g or mL)/1,000,000(g or mL)

1. 6. 40g of AgCl was dissolved in water to create 3,000,000 mL solution. ***What is the concentration of this solution in ppm?*** **___/3**

Show Work: Solution: _____

2. 4 mL of HCl was dissolved in water to create a 7500 L solution. ***What is the concentration of this solution in ppm?*** **___/3**

Show Work: Solution: _____

3. A 2000 L Hot tub has a Chlorine concentration of 0.8 ppm. ***How many grams of Chlorine were added to this hot tub?*** **___/3**

Show Work: Solution: _____

4. 0.002 Kg of NaCl was added to water to make a solution with a concentration of 9 ppm. ***What is the volume of this solution in litres?*** **___/3**

Show Work: Solution: _____