THOMPSON RIVERS UNIVERSITY | Education & Social Work

Bachelor of Education (Elementary) & Bachelor of Education (Secondary) STEM Lesson Plan

Lesson Title: 5.2 Concentrations **Lesson #** 2 **Date:** January 12

Name: Janys Pierce **Subject:** Chemistry **Grade(s):** 11

Rationale:

This lesson plan is important because the students will be learning how to calculate concentrations and how to do dilution calculations. These are both important throughout their chemistry careers down the road, and within laboratory calculations. This lesson includes an FPPL.

Core Competencies:

Communication	Thinking	Personal & Social
Connecting and engaging with others: students engage in informal and structured conversations where they listen, contribute and develop understanding and relationships, and learn to consider diverse perspectives. **Acquiring and presenting information:** students communicate by receiving and presenting information. **Working collectively**: students combine their efforts with those of others to effectively accomplish learning and tasks.	**Analyzing and critiquing:** students learn to analyze and make judgements about work. **Questioning and investigating:** students learn to engage in inquiry when they identify and investigate questions, challenges or problematic situations in their studies.	**Identifying personal strengths and abilities:** students acknowledge their strengths and abilities, they intentionally consider these as assets, which aid them in other aspects of their lives.

Big Ideas (Understand):

The mole is a quantity used to make atoms and molecules measurable.

Learning Standards:

(DO)	(KNOW)
Learning Standards - Curricular Competencies	**Learning Standards - Content**
• Apply the concepts of accuracy and precision to experimental procedures and data: significant figures • Use appropriate SI units and appropriate equipment, including digital technologies, to systematically and accurately collect and record data • Seek and analyze patterns, trends and connections in data, including describing relationships between variables, performing calculations and identifying inconsistencies	• **The mole** • **Reactions** • **Local and other chemical processes**

Instructional Objectives & Assessment:

Instructional Objectives (students will be able to…)	Assessment
• Calculate concentrations of ions • Calculate dilutions (M1V1 = M2V2) • Be able to apply these calculations within laboratory settings	• **Example questions and textbook questions** • **Observation when walking around the classroom**

Prerequisite Concepts and Skills:

Students should know basic chemistry vocabulary i.e., covalent, ionic, ions, etc.
Students should know what an acid and a base are, what nonmetals and metals are
Students should be able to do basic math and know how to use a calculator
Students should be able to follow along during notes

Indigenous Connections/ First Peoples Principles of Learning:

As far as I am concerned this lesson does not directly tie to any Indigenous Connections
FPPL: learning involves patience and time.

Universal Design for Learning (UDL):

- **I am verbally going over the notes while providing a printed version**
- **I have prepared extra questions for more practice if people are still having troubles**
- **I have prepared a review form last days lesson – to aid them in remembering that lesson and the important aspects from that lesson**

Differentiate Instruction (DI):

- Allow 'thinking time', time between asking questions and expecting an answer
- Provide a list of the days plans at the beginning of the class
- I will be at the front of the class writing the notes on the tablet – so no unnecessary movement from me

Materials and Resources:

- Note package
- Tablet and projector
- Textbooks

Lesson Activities:

Teacher Activities	Student Activities	Time
Introduction (anticipatory set – "HOOK"): • Start class with a review of yesterday on the white boards • Does anyone remember if distilled water conducted electricity from the demo yesterday? Did sugar water? Why did sugar water not? • How can we determine what conducts electricity without measuring or using a probe? (a metal conducts, A&B conduct, ionic conducts) if I give you HNO3 does this compound conduct electricity? Why? Please write out the dissociation equation. Does NO2 conduct electricity? Why not? Write out the dissociation equation as well. How about H2O2? • Let's take out our unit 5 note package and start on unit 5.2	• Participate within the review – ask questions they may have • Start to take out note package	7 mins
Body: • Let's write out the dissociation equation for Ba(OH)2, don't forget to balance the equation. • Now we need to calculate the concentration of this compound within 3L, we know that concentration is molarity, which is moles/ litre – we have a starting weight of 16.1 g and we want to find out the concentration – we need to get rid of the g, which we can do by multiplying the molecular weight which is 171.3 g, we are then left with moles and we are given 3L – so we just divide our moles by litres and we have our concentration. • The second question here is what is the concentration of each ion – since we already wrote out the dissociation equation and balanced it – we can very quickly do this. Each ion has a concentration of 0.03 we then look at our balanced equation and figure out each ions concentration. The Ba has 0.03 and the OH has a 2 – making the total concentration 0.06 for that ion – then the total ion concentration is just the addition of those two concentrations – 0.09M • There is an easier way to calculate concentrations i.e. C1V1 or M1V1 – they are the same so it does not really matter,	• Begin taking notes with me, asking questions if they have any and hopefully answering mine when I ask.	35 mins

one is just concentration and the other is molarity. • Let's do some examples where we can use this new formula – Please watch out for sig figs. Even I am terrible for sig figs. • Let's take this up a notch and try mixing 2 solutions with common ions – it is a bit trickier, but basically, we are going to ignore the second concentration we are given for the time being – we will calculate the first concentration using m1v1, then move onto the one we just ignored. We will then add these two together to calculate the common concentration. • A Part B that could be asked with this question is what are the concentration of the ions and finally what is the total ion concentration – which we learnt yesterday and reviewed earlier. • Now there is a question for you guys to practice, I'll give you a few minutes to calculate it.		
Closure: • As you saw yesterday, your lab write-up needs this new calculation we just learnt to finish it. Feel free to just use a lined piece of paper, it does not need to be fancy. If you need help just ask, I will be wandering around. • If you finish that, I have a few m1v1 questions I can put up on the board to practice! • And if you are really speedy today, you will be having your unit test later, so you can always study or ask any last-minute questions you may have.	• Finish the lab from the day before • Do the practice questions • Study for unit test	15 mins

Organizational Strategies:

- Have the review questions prepared already (done)
- Have my copy of the notes filled out, to make it a bit faster in filling out the notes
- Prepare some questions to ask/ prepare for some questions they may ask

Proactive, Positive Classroom Learning Environment Strategies:

- Letting the students know ahead of time that I will be asking questions but do not necessarily expect them to answer
- No negative feedback if anyone answers incorrectly, just say not quite and lead them in the right direction – and assure them that it is not an easy topic and that I have created more practice questions if people are still having difficulties

Extensions:

Reflections (if necessary, continue on separate sheet):
