THOMPSON RIVERS UNIVERSITY | Education & Social Work

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

Lesson Title: Literacy Activity – Chemistry Unit Lesson # _____ Date: _____

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Rationale:

Literacy must be meaningfully addressed wherever and whenever possible, as literacy is the foundation for learning. Strong literacy skills enable students to comprehend information across disciplines. In the field of science, scientists communicate their findings with the world through literature. Reading, understanding, and summarizing written scientific text is a skill that needs to be practiced, and this lesson touches on each of these components of literacy, while solidifying understanding of relevant concepts they have been previously introduced to.

Core Competencies:

Communication	Thinking	Personal & Social
Communicating: Students will be practicing their scientific communication skills by reading, taking notes, and summarizing a piece of scientific literature. When peer-reviewing each other's work, they will be required to think critically and holistically about the quality of the summary and identify ways in which their peers can enhance their work.	**Critical and Reflective Thinking:** Students will be practicing their critical thinking skills by picking out important and key ideas in the reading that they will use to summarize the text (what is critical to the understanding of the article? What is filler?). They will need to think back on their previous knowledge to understand some of the components of the article and build connections between concepts. They will also be challenged to reflect on their own practices when it comes to the use of products and materials and identify ways in which they can make more sustainable choices.	

Big Ideas (Understand)

The behaviour of matter can be explained by the kinetic molecular theory and atomic theory.

Learning Standards

(DO)	(KNOW)
Learning Standards - Curricular Competencies	Learning Standards - Content
• Communicate ideas, findings, and solutions to problems, using scientific language, representations, and digital technologies as appropriate	• kinetic molecular theory (KMT)

• Consider social, ethical, and environmental implications of the findings from their own and others' investigations	

Instructional Objectives & Assessment

Instructional Objectives (students will be able to…)	Assessment
• Students will be able to define and/or describe vocabulary terms in the reading	• As part of the assignment, students will have to define 5-7 vocab words or concepts from the article they found challenging (summative, product-based assessment)
• Students will be able to identify and summarize key takeaways from the reading	• Students will have to build a first draft (formative assessment) and second draft (summative assessment) summary of the key takeaways from the reading using the guiding questions provided
• Students will be able to assess the work of their peers and provide constructional feedback	• Students will have to peer-review each other's work before moving on to their final drafts - observational assessment (yes/no), drafts with peer review notes will be submitted, but students are encouraged to provide verbal feedback as well
• Students will be able to reflect and connect their new learning to real life experiences	• Students will submit an explanation of a few considerations they can make when using or purchasing products to live more sustainably, making connections to what they have learned in the reading (summative assessment) ALTERNATIVELY this can be a class discussion, ideally with input from everyone/every group (conversational assessment)

Prerequisite Concepts and Skills:

Understanding of atomic theory, KMT, behaviour & properties of matter – chemical vs. physical (this would be at the end of a chemistry unit).

Indigenous Connections/ First Peoples Principles of Learning:

Learning ultimately supports the well-being of the self, the family, the community, the land, the spirits, and the ancestors.

This activity allows students to reflect on how their personal choices affect the environment, community, and future generations, and gets them thinking about how they can contribute to sustainability. It will also get students thinking about the purpose of scientific inquiry, which is to further our knowledge of the world around us, knowledge that can contribute to the well-being of both humankind and the environment. When creating and using new polymers, scientists must not only

consider functional aspects of materials, but their environmental impacts as well, highlighting the importance of sustainable scientific practices.

Additionally, the goal of this lesson is to improve scientific literacy and communication skills, building their ability to critically think about scientific concepts to further their understanding of the world around them.

Universal Design for Learning (UDL):

The literature is accessible to grade 8 students and has vocabulary definitions written within the text for ease of reading. The reading also has some diagrams to help students visualize some concepts (additional visual representations will be provided during the activity "introduction").
The writing assignment is scaffolded to help guide students to their final draft (read, write notes, write a draft, peer edit the draft, type a final draft).
This activity allows for interactive feedback from peers as well as from the teacher. Students will be tasked with finding real-world connections to help with relevance.
As always, students will be encouraged to communicate with each other about their understanding of the reading and their approaches to the task.
Extension questions for students who want to take it to the next level.

Differentiate Instruction (DI):

Should students need any specific differentiation, accommodations will be made for them.
Examples include:
Having the paper read to students who struggle with reading or using text-to-voice software.
Reducing the workload, such as only having students submit the vocabulary words or the notes they took on the reading.
Giving students the option to type rather than handwrite their notes and first draft, or use voice-to-text.
Graphic organizers or sentence starters for students to help organize and structure their writing.

Materials and Resources

Link to the reading
Pre-printed copies of reading (1 for each student)
Scaffolded writing template (1 for each student)
Introduction slides with LO
Chromebooks

Lesson Activities: Don't put yourself in 2 places at once. Be realistic on how long things will take.

Teacher Activities	Student Activities	Time
Introduction (anticipatory set – "HOOK"):		
Attendance with attendance question.	Students will be listening during attendance.	~3 min
State the activity of the day (literacy assignment). Brainstorm as a class WHY might literacy be important to practice in science?	Students will be listening and participating in the class discussion.	~10 min
Read title of the article "Can materials made of the same elements have different properties?". Ask students to think about the question for a few seconds, then get students to tell the class what they think.		

We all know what elements are by now, but can we think of any examples of things made of the same elements, but they have different chemical or physical properties? What about water? We know water, water vapour, and ice are all made of H2O, but they behave different and have different properties, such as density and structure. Can we think of any other examples? Does anyone know what the lead in your pencil is called? What is it made of? Show students pictures of the structure of diamonds and graphite and get them to compare/contrast. Ask if students want to volunteer to read some/all of the abstract. Pause at certain moments to check for vocabulary word understanding. For example, polymer. Poly comes from ancient Greek and means "many", so we know polymer means many of something. Can we think of a super common polymer that we have created that has a negative impact on the environment? (plastic) Why do you think scientists might want to make polymers out of more natural things, such as sugar? (biodegradable) Can we summarize the abstract in 3 sentences together as a class? First, let's talk identify the key words and how they help give us some context of the abstract, then let's use these in our summary sentences. Gets students warmed up and thinking about the activity. Introduce the activity – what students will be doing. Go through the assignment template together with the rubric. Could I offer some tips for time management in these sections? Put the instructions on the projector along with learning objectives. What is actually done by the students can be differentiated according to individual needs. Learning Objectives:		

By the end of this activity, you will be able to define key vocabulary words and concepts in this article. You will be able to evaluate a piece of scientific literature and outline key takeaways from each section. You will be able to formulate your notes and ideas and create a thorough summary of the article.		
Body: Circulate the class to see how students are doing. If there are any vocabulary words or concepts several of them are stuck on in the article, address the entire class to clarify things.	Students will be working on reading, defining, taking notes, summarizing, and doing peer reviews.	~50 minutes
Closure: Pack up/Chromebooks away. Let students know this will be due in 2 days. Choose 5 or so students at random or get volunteers to share something they found interesting from the article, or to share the meaning of a vocab word if they did not find it interesting.	Students will be packing up and putting things away Students will be engaged and participating in the class discussion (speaking or listening)	~5 min ~5 min

Organizational Strategies:

Activity instructions will be projected and posted on google classrooms. All relevant documents/slideshows will be pre-loaded to save time.

Proactive, Positive Classroom Learning Environment Strategies:

Brain break between the introduction and starting the activity (active or otherwise depending on the mood). Relaxing music playing while students work. Encouragement to discuss the activity with classmates to promote collaboration and communication of scientific ideas. Promote a no-judgment culture, students will be expected to provide positive constructive feedback when doing peer reviews.

Extensions:

Students can investigate other allotropes or polymorphs (diamond/graphite/graphene, cellulose/glycogen/starch, diatomic oxygen/ozone, etc.) and conduct a compare and contrast of the chemical and physical properties of them and/or their functions

Reflections (if necessary, continue on separate sheet):
