

Lesson Plan Information	
Subject/Course: Trans-Disciplinary Potential. Integration possible in: Language Arts, Sciences, Math, History, and Social Studies.	Name:
Grade Level: 7-12	Date: Time:
Topic: Ground-Breaking Scientists/Infographic	Length of Period: 150 minutes
Expectation(s)	
Big Idea OR Framing Question (Directly from the Ontario Curriculum):	
<p>CHC2D - Strand B - Framing Question - “In what ways did the lives and struggles of different individuals, groups, and communities help shape Canada during this period? What lasting impact did they have on Canada?” (Canadian and World Studies: Grades 9 and 10, 2018, p. 108).</p>	
Expectation(s) (Directly from the Ontario Curriculum):	
Utilize expectations for the current course being instructed.	
Learning Skills: Critical Thinking	
Content	
What do I want the learners to know and/or be able to do?	
Today learners will:	
<ul style="list-style-type: none"> - Relate your primary learning goal to the specific expectation for the course being currently instructed. - The suggested Learning Goals related to the discovery of insulin are the following: <ul style="list-style-type: none"> - Understand what it means to be scientifically literate - Understand the importance of being scientifically literate to advocate for a healthy life for self and others - Apply scientific literacy to help themselves and others lead a healthy life - Connect scientific literacy to the study of comorbidity factors as they relate to diabetes 	

Assessment / Evaluation

(Recording Devices: anecdotal record, checklist, rating scale, rubric, success criteria)

Based on the application, how will I know that the learners have learned what I intended?

- Student generated conversation will allow for partial indication of understanding. This can be accomplished using your anecdotal records, exit tickets or another preferred method.
- Students will be generating a storyboard using the Seven Sentence Story Structure Method described in Lesson 1.
 - Note: This is an overarching task, and will hopefully conclude at the conclusion of this lesson.

Learning Context

A. The Learners

(i) What prior experiences, knowledge, and skills do the learners bring with them to this learning experience?

- Learners may be impacted by diabetes and insulin in their own life, or through the experiences of relatives or friends.
- Learners may also be familiar with insulin as it is a common example to use of Canadian innovation and invention.
- Learners will be familiar with the Banting and Best story.
- Learners may have seen the stamp or the heritage minute (to be released).
- Learners will have begun learning about insulin and its story through the Insulin100 Lessons.
- Learners are very familiar with all Insulin100 lesson terminology.

(ii) How will I differentiate the instruction (content, process, and/or product) to ensure the inclusion of all learners? (must include, where applicable, accommodations and/or modification for learners identified as exceptional)

- Exceptional learners should be provided with their standard accommodations and modifications.
- ELL students should be provided with their standard accommodations.
- When building a compelling argument, limit the number of supporting arguments to 2 or 3 for students who may need additional time.

- Allow students to present their infographics in either a digital or hand-drawn format.
- Students in lower grades may be encouraged to work together in groups to share responsibility for all 8 information cards. Students in higher grades may be encouraged to work more independently.
- Students may be encouraged to select the information cards they believe they are most accessible to them or are of personal interest.
- Students can base the ideas for their infographic on some of the information provided in this lesson, on all the information provided, or extend and refine their ideas based on additional research.
- COVID19 Limitations
 - Note: This lesson is optimally delivered in a traditional classroom setting. However, due to COVID19 restrictions you may choose to do this in an alternative method than described below. Suggestions for alternatives are as follows:
 - Student presentation of their infographics can still be differentiated. Allow students to choose the presentation medium that best suits their needs in a non-traditional setting.

B. Learning Environment

Instructors may include a map of their classroom in this section, including desk placement, and the location(s) of resources/materials.

C. Resources/Materials (*cite resources as may be necessary*)

- Appendices (see attached file)
- Chalkboard/Chalk
- Whiteboard/Markers
- Smartboard (Optional)
- Projector

Teaching/Learning Strategies

INTRODUCTION

How will I engage the learners? (e.g., motivational strategy, hook, activation of learners' prior knowledge, activities, procedures, compelling problem)

Prior to launching the learning

- Consider having a brief conversation forewarning students that you will be having a discussion regarding healthy lifestyles, which will include mentions of physical and mental health.

Launch the learning

- Provide students with the following definition for scientific literacy:
 - Scientific literacy is the ability to read and understand, observe and make sense, select relevant and reliable information, communicate using appropriate language, listen and process and make sound decisions that are informed by science.
 - Alternatively, ask students what they think scientific literacy means. Prompt students towards a definition close to the one above if needed.
- Ask students to reflect on: "How helpful do you think it is to be scientifically literate to live a healthy lifestyle?" (not helpful; a little helpful; somewhat helpful; very helpful)
 - Ask students to justify their decision based on their own personal experiences, and the experiences of those that they know.
- Ask students what living a healthy life may involve. As students share their thoughts invite them to consider a broader definition of a healthy life which includes many indicators beyond just physical health (for example, emotional, psychological, cognitive, mental and social health).

Set the task

- Inform students that they will be considering how being scientifically literate can be used to help develop an infographic that highlights the best ways to help someone with diabetes lead the healthiest lifestyle achievable. This infographic will need to communicate important and accurate information and suggest helpful actions to promote a healthier future.
 - Depending on the level of learners in the classroom, briefly explain what

an infographic is.

- Note: It is recommended to show students some of the infographic fact sheets from Insulin100 Lesson 3 to act as exemplars.

MIDDLE

Teaching: How does the lesson develop? How we teach new concepts and processes (e.g., gradual release of responsibility – modeled, shared, and guided instruction; content and strategies).

Construct understanding of criteria for being scientifically literate

- Note: Prior to handing out the information cards, consider how you are going to organize your class. Organize students either individually, in pairs or into small groups depending on learners needs.
- Provide students with several pieces of information that suggest ways to improve the health of people who suffer from diabetes (see Appendix 5-1 for 8 information cards).
 - Note: Some information will be more scientifically sound than other information and that the information has been intentionally selected to surface the attributes of scientific literacy.
- Ask students to consider the information on each card, summarize the topic the information addresses, and use the information to suggest ways to help people with diabetes lead the healthiest life possible.
- Using the thinking organizer in Appendix 5-2, encourage students to also describe how they used scientific literacy to suggest ways to help
 - Note: Consider doing a think aloud to share the example provided in the template with students so that they have a clear understanding of how to complete the template.

Present students with the following descriptors for scientific literacy.

- A person is scientifically literate when they...
 - Are open-minded (willing to open my mind to other ideas if it is supported by quality evidence), full-minded (I make up my mind only after I've considered enough evidence) and fair-minded (I don't reject any evidence until I've thought about its quality regardless of source)
 - Consider how reliable sources of information are
 - Select and use information that is both directly and indirectly relevant
 - Consider the quality of the information; it's strengths and limitations – what is known and what is yet to be known
 - Identify options and select thoughtfully from those options
 - Transfer scientific knowledge into specific everyday contexts
 - Observe and generalize specific phenomena
 - Accurately read, understand and communicate scientific terms and

- concepts
- Make sound decisions informed by science
- Understand past trends and think prospectively to guide current and future actions

Ask students to indicate which aspects of scientific literacy they used as they considered the helpfulness of each piece of information in determining what actions can be taken to help those with diabetes live a healthy life.

- Provide students time to revisit the information on each of the cards using all of the descriptors to help them build their capacity to be scientifically literate (see Appendix 5-3: How to be scientifically literate)
- Have a class discussion inviting students to share how their ideas (about ways to help people with diabetes lead the healthiest lifestyle achievable) changed after they applied the descriptors (criteria) for being scientifically literate.

Encourage Iterative Thinking

- Invite students to revisit the definition for scientific literacy: Scientific literacy is the ability to read and understand, observe and make sense, select relevant and reliable information, communicate using appropriate language, listen and process and make sound decisions that are informed by science.
 - Encourage them to revise it so that it captures all they have learned about being scientifically literate.
- Ask students to revisit their initial thinking on: “How helpful do you think it is to be scientifically literate to live a healthy lifestyle?”
- Invite them to compare their initial assessment (made in the Learning Launch) to their current position using the same continuum: (not helpful; a little helpful; somewhat helpful; very helpful)
 - Encourage students to justify why their assessments have changed using their learning.

Share the following statements with students:

- A) It is becoming increasingly difficult to discern between what is fake and what is real, so we need to communicate the science in ways the public can understand and have that information be timely and relevant to the decisions they have to make. (Mark Balschweid)
 - Note: This is a push to cultivate critical thinking skills.
- B) Scientific knowledge helps people to be better-informed and make the best decisions possible with the best available knowledge.

Invite students to discuss in partners what each of these quotes tells about the importance of scientific literacy. Chart the class ideas ensuring students understand the following two reasons why it is important that all people become scientifically literate:

- To discern information that is reliable vs. unreliable

- To make sound decisions based on scientific truths
 - Connect the above two ideas to the process of the scientific method. For example, discuss with students how the scientific method involves making a hypothesis based on current scientific knowledge and understanding, that is then tested thoughtfully using the evidence gathered to draw a reasoned conclusion.

Ask students, working in small groups of 3-4 to generate additional ideas on why it is important that all people become scientifically literate. Add them to the charted list.

- Invite students to consider the following additional reasons for why it is important that all people become scientifically literate and to affirm, revise and extend the ideas on the charted list.
 - a) to appreciate the world around them;
 - b) to make informed personal choices;
 - c) to be able to intelligently discuss public issues
 - d) to appreciate everyday activities;
 - e) to be able to synthesize information from various topics
 - f) to be able to evaluate information to decide a suitable course of action
 - g) to communicate ideas clearly, succinctly and appropriately for a specific purpose and audience.

Ask students to consider the following question:

- If you found out a close friend or family member was diagnosed with diabetes and you wanted them to consider the best ways to lead the healthiest life possible, how could you use scientific literacy to guide your thinking. Help students connect their response to the criteria for scientific literacy (Appendix 5-3).
 - Generate class discussion to allow all learners to have a basis of ideas.
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Provide students with time to apply what they have learned about scientific literacy to identify the best ways for people with diabetes to lead the healthiest life possible and to communicate their ideas in the form of an infographic using the software Canva or other method they are comfortable with.

- Encourage students also identify a specific audience for the infographic (might be someone they know with diabetes, a specific age-group or demographic, or a specific type of diabetes, or to increase general awareness, to name a few).
- Note: Students can draw on the ideas they came up with in this lesson or grow and refine these ideas by gathering more research. Additional research may be necessary if the student's audience is tightly targeted.

Share your infographic (where is it going?)

- Encourage students to share their infographic with a peer, family member or teacher to gather feedback on its effectiveness. Students may use the criteria

for scientific literacy and the following criteria for an effective infographic in the feedback process:

- focused on a clear, single message or goal
- concisely includes only most important, actionable information
- information included is accurate and credible
- includes a clear, concise and captivating title that grabs the reader's attention
- uses simple combination of primary colours chosen with specific reasons
- elements are well-spaced out allowing clean spaces (spaces without text)
- use no more than three fonts (one for title; one for body; one for flavour)
- spelling and grammar mistakes do not distract or confuse the reader
 - Encourage students to make independent, justifiable choices about what feedback to heed.
- Encourage students to share or post their infographic so that their intended audience can have access to it. Where appropriate encourage them to use a social media platform that appeals most to their audience.
 - If possible, have students display their work on a course bulletin board for the school community to see.

Wrap up learning

- Have students revisit their list of the most essential attributes for a ground-breaking scientist.
- Encourage them to consider to what degree being scientifically literate fits into their list.
 - Are there descriptors of scientific literacy that they have already captured?
 - Are there descriptors that are missing and should be added to the list?
 - What percentage of the overall list of essential attributes describe being scientifically literate?
 - What role does participation in science communication play in validating scientific literacy or characterizing a groundbreaking scientist?

Invite students to consider if and in which ways a person with diabetes can lead the healthiest life possible could be included in their compelling story of the discovery of insulin, particularly as they try to inspire future actions.

- Allow this to be a classroom conversation. When possible, allow students to inspire each other.

Consolidation and/or Recapitulation Process: How will I check for understanding?

- Understanding will be checked for through student discussion of scientific literacy.
- Understanding will be checked through student completion of scientific literacy infographics.

Application: What will learners do to demonstrate their learning? (moving from guided, scaffolded practice, and gradual release of responsibility)

- Students will demonstrate their learning through the presentation of their infographics.
- Students will complete the stories they have been working on throughout the Insulin100 lessons.
 - If necessary, allow students extra time to complete their stories.

CONCLUSION

How will I conclude the lesson?

- Inform students they have finished learning about the story of insulin and will now finish crafting their own stories with all they have learned.
- Remind students that today's lesson was designed to impart the importance of scientific literacy and hopefully motivate them to use their infographics and stories to push for positive change in the world.

My Reflections on the Lesson

What do I need to do to become more effective as a teacher in supporting learning?

References

Ministry of Education, (2018, revised).

<http://www.edu.gov.on.ca/eng/curriculum/secondary/canworld910curr2018.pdf>. Toronto, Ontario.

Defining Moments Canada. (2021, January 14, revised). <https://definingmomentscanada.ca/>.

*This lesson plan template has been adapted from the Nipissing University Schulich School of Education Bachelor of Education lesson planning template.