# LESSON 3

| 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:**<br>**Time:** |
| **Topic:** Finding a Cure for Diabetes/Compelling Arguments | **Length of Period:** 180 minutes |

**Expectation(s)**

**Big Idea OR Framing Question *(Directly from the Ontario Curriculum):***

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).

**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:**

- 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:
  - Each discipline explores the issue of diabetes through different perspectives and interprets evidence in different ways.
  - • There are compelling demands for many competing medical research priorities, including a cure for diabetes.
  - Diabetes research has helped improve lives for many.
  - The occurrence of diabetes varies within the population
    - This variance can occur as a result of several factors (Socio-economic, food

availability or scarcity, etc).

**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 continue over the sequence of Insulin100 lessons.

**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.

**(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.
- The number of disciplines used within this lesson can be limited based on grade, curriculum requirements, and the level of learners being instructed.
- 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 argument in a variety of formats - video, oral

presentation, essay format etc.
- 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 compelling arguments 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)
    -
- DMC Lesson 3 Fact Sheets (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)**

Ask students which two of the following arguments they would use if they were trying to convince someone to support research for a cure to diabetes in 3 minutes or less:

- Sample items
  - 1. The number of people with diabetes has risen from 108 million in 1980 to 422 million in 2014.
  - 2. People with diabetes must monitor what they eat and should limit the amount of soda, sweets, desserts, and other foods that are made primarily of processed sugar they consume.
  - 3. It is estimated that diabetes causes 3.8 million deaths every year.
  - 4. Health systems around the world spend $465 billion annually fighting the disease.
  - 5. The global rates of diabetes among adults over 18 years of age has risen from 4.7% in 1980 to 8.5% in 2014.
  - Source: World Health Organization, https://www.who.int/news-room/fact-sheets/detail/diabetes
- Note: Students can be asked this to generate a class discussion, or you can allow students to personally critically think or engage in a think/pair/share with a classmate.

**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).**

Inform students that nearly $300 billion a year is spent on medical research.
Deciding where to spend the money and on what to focus the research is a decision that we all participate in.

- Different levels of Government, corporations, research institutes and universities share in a complex decision-making process to determine how much funding to provide for research into a wide variety of medical issues.

- Sometimes, these decisions are the function of emerging public health crises (ie) like COVID-19, and sometimes the decisions are made through large donations from public and/or private contributors. National and international organizations like the WHO and other non-governmental organizations also play a role in the decision-making, especially during times of global pandemics or health emergencies. And, of course, at an individual level, our advocacy in support of different areas of

medical research through charitable donations or volunteer work play a big role in determining the focus of research.
- When making difficult decisions around where to focus medical research efforts, many factors must be taken into account. Inform students that they will be constructing a compelling argument for research into a cure of diabetes being a top priority. To build their argument they will be considering evidence from the perspective of a variety of subject disciplines.

Share/construct criteria for a compelling argument

- Present students with three sample arguments around wearing face masks (Appendix 1: Arguments for Wearing Face Masks)
- Ask that they read each of the arguments and then rank them from the most to least compelling. Invite students to share what they were thinking to help them do their ranking. For example, what did they consider as they were deciding that one argument is more compelling than the others? Do not have students share their actual rankings as they will be more focused on the answer rather than the thinking to surface the criteria. For some students you may want to ask them to focus on the most and least compelling arguments only, explaining why one is clearly more compelling than the other.
- After students have ranked and explained their decision, encourage them to review the arguments presented by their peers. Ask that each student select at least one statement made by a peer that was effective at getting them to re-consider their ranking or provided a different argument than they had thought of that supports their ranking.
- Invite students to share what they believe were the key features of a compelling argument.
- Point out to students that a key difference between a “strong” argument and a “compelling” argument is that a compelling argument is designed to encourage others to act.
- Present students with the following set of criteria for a compelling argument and ask them to decide which 3-4 criteria should be kept and/or if any other criteria should be added?

Note: This can be a classroom discussion, accomplished in small groups, breakout rooms, or think/pair/shares.

Criteria for a compelling argument

- Focused on a coherent meaningful purpose that promotes prospective thinking
- Based on the most significant relevant and reliable evidence from a variety of disciplines
- Built on insights that consider the evidence from a variety of discipline-based perspectives
- Sets out a clear general/broad action (e.g. global mandate for ...; prioritize the allocation of resources in support of...; finding a cure for diabetes etc.) supported by a range of possible supporting actions (dedicated lab space in key locations; strategic



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funding proposal etc.)
- Makes effective use of powerful language to support the driving claim (strong words such as essential, imperative, vital...etc.)
- Ensures the purpose, evidence and action support each other and do not change throughout the argument

Build background knowledge through a variety of disciplines
- Present evidence from up to 6 different disciplines related to diabetes (have students source their own data, or use the provided fact sheets - see attached).
- Students working in pairs/groups examine the evidence from each discipline to extract evidence, or trends and patterns, that are important.
- Groups share what they have been able to extract from the various bodies of evidence by posting their lists, on the wall in the classroom, or online.

Questions to focus the examination of the evidence (Note: These questions can be used by students to begin sourcing their own data as well):

Math: Questions Mathematicians would ask...
- What trends or patterns do you see?
- How consistent is/are these trends?
- Can predictions be made using these trends?
- Note: Analyzing statistics over periods of time yield trends.

Science: Questions Scientists would ask...
- Does diabetes affect quality of life and longevity?
- Does diabetes cause other ailments or complications?
- How life threatening is diabetes?
- Genetic or epigenetic?
- Note: Students can look at entry-level scientific articles, as well as Youtube videos that provide excellent summaries.

History: Questions Historians would ask...
- Has the prevalence of diabetes changed over time?
- Have attitudes towards diabetes changed over time?
- Which societal changes have had a significant impact on increasing or decreasing the growth of diabetes?
- Which factors may explain higher or lower rates of diabetes in different regions of Canada?
- Note: If students are stuck, have them analyze diabetes (prevalence, attitudes, rates) at strikingly different time periods (Ex. Pre-Insulin, Pre-WW2, 1960s, modern day, etc.)

Sociology: Questions sociologists would ask…

- Does diabetes significantly impact people's ability to take part in leisure activities?
- Does diabetes significantly impact on personal relationships?
- Does diabetes impact on families? How does it impact on parents and siblings?
- Does diabetes impact on people's happiness and sense of well-being?
- Note: Students can extend this to different age groups to expand evidence.

Economics: Questions Economists would ask...

- What is the demand for diabetes treatments and medications?
- Is there sufficient supply of medications, treatments, technologies...?
- How does diabetes affect productivity and number of sick days taken?
- How much government expenditure is currently used to support diabetes research relative to other illnesses?

Geography: Questions Geographers would ask...

- Is diabetes more prevalent in certain areas in the world, countries, provinces, cities?
- Are there any important patterns or trends evident in this distribution (more cases of diabetes in developed or developing countries?)
- Are some racial groups more likely to develop diabetes?
- Note: Have students analyze a few different nations. These nations may be differentiated based on development status, or location.

Introduce thinking strategy to help build a compelling argument

- Present students with Appendix 2: P.E.A.S. Distinguish for students the difference between simple arguments and complex arguments. Simple arguments are focused on a single idea or perspective; a complex argument is constructed through the careful weaving together of several simple arguments so that it makes a strong case for action through the connections between related disciplinary perspectives. Both simple and complex arguments can and should be compelling.
- Review the samples to help students understand how the thinking strategy can be helpful in building arguments. Ask students to practice by completing the empty cells for the final two examples. If time permits, ask students to generate one or two additional samples with each cell completed. Once students have a clear understanding of how to use P.E.A.S., provide them with Appendix 3: Framing Simple Arguments Using P.E.A.S.
- Ask that they work in pairs/groups to use the evidence gathered from the various subject areas to construct a set of simple and compelling arguments using the P.E.A.S. format.

Share draft arguments

- Invite the student pairs/groups to share the simple arguments they have constructed by posting them online or on the walls of the classroom. Encourage each student to

review at least three sets of simple arguments by commenting on their strengths and making helpful suggestions to improve the arguments.
    - These comments should either be written by the students reviewing each argument or the "poster" should take notes on comments regarding their own argument.
- Note: In a non-traditional classroom setting, students may utilize a blog-post or discussion thread to share their simple arguments with their peers.

Introduce "Prospective" Thinking

- Introduce the concept of prospective thinking by presenting the following definition: Prospective thinking is future-oriented. Prospective thinkers look at past and current events to identify trends and patterns they can use to plan for positively impacting the future
    - Note: Prospective thinking can be scaffolded by creating a classroom conversation about historical cause and consequence (noting that consequences can be positive in nature).
- Ask students to review the three arguments for face masks (Appendix 1). Inform them that two of the three arguments contain a prospective element. Ask that they identify the arguments that contain a prospective element and that they underline the relevant section. For the argument that does not contain a prospective element invite students to edit the argument so that it also contains a prospective element.
- Encourage students to share their revision through a class discussion or by posting online.
- Review the criteria for a compelling argument and ask students "Which of the criteria is most affected by prospective thinking?"

Criteria for a compelling argument

- Has a clear purpose
- Is based on relevant and reliable evidence;
- Motivates people to take action;
- Makes effective use of language to support a claim (e.g. strong words such essential, imperative, vital...);
- Ensures the purpose, evidence and action support each other and do not change throughout the argument

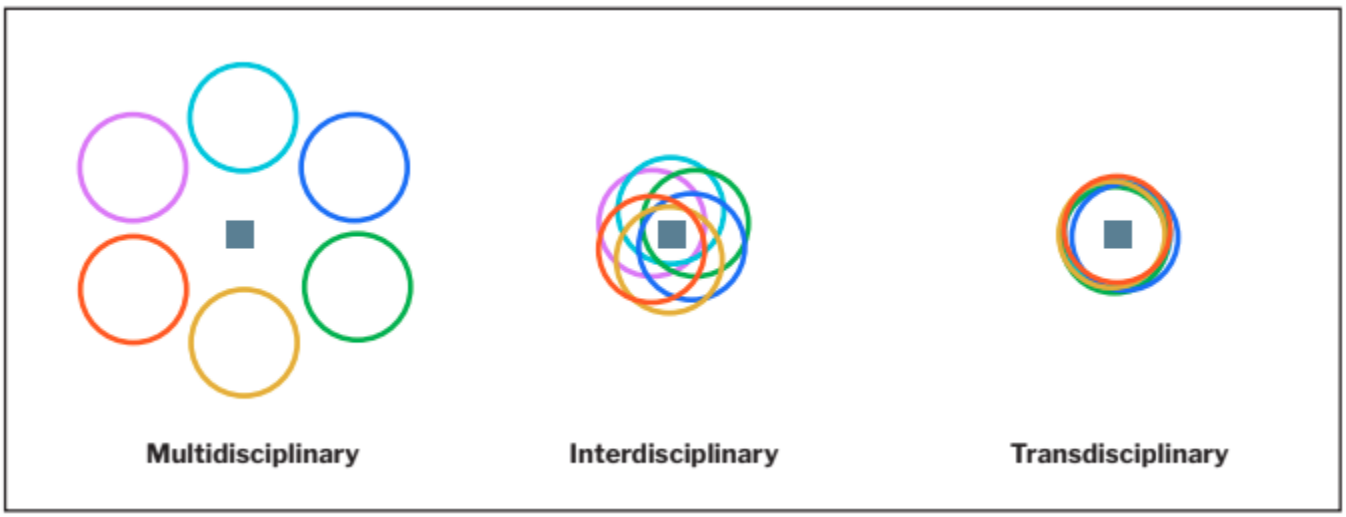
Revise and polish compelling argument

- Encourage students to revise their simple arguments considering where there are opportunities to add a prospective thinking element. Also encourage students to reflect on the strengths of the arguments they reviewed and the comments made by their peers about their draft arguments.
- Allow students time to make revisions to their set of arguments that:
    - Improve clarity, and/or

- Adds a prospective element, and/or
- Strengthens the argument, and/or
- Makes more effective use of evidence.

Construct a Complex Argument

- Introduce students to “transdisciplinary” thinking by sharing the following image:




- Invite students to describe in words what each of the images convey about the differences between the terms multidisciplinary, interdisciplinary and transdisciplinary. Help them to see that multidisciplinary refers to considering evidence from a variety of disciplines around a common issue; interdisciplinary refers to looking for the intersections of a variety of disciplines as they relate to a common issue; and **transdisciplinary** refers to combining evidence from a variety of disciplines to create a new more holistic argument.
- Ask students to use the collection of simple arguments they created through the consideration of evidence from a variety of disciplines to construct a coherent compelling argument. Inform them that this will require developing a central argument or thesis statement around which the simple arguments can be organized to construct the complex, compelling argument.
- Provide students with a copy of Appendix 4: Developing a Complex Argument and ask that they use the arguments they have developed to construct a complex, compelling argument for the search for a cure to diabetes being a top priority in the field of medical research.

**<u>Consolidation and/or Recapitulation Process</u>: *How will I check for understanding?***

- Understanding will be checked for through student discussion of the different questions and evidence gathered from the various disciplines.

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

- Students will continue to work on their 7-Sentence Story Structure Thoughtbook.
    - Today's lesson allows students to craft a complex, compelling argument to their stories for making the cure for diabetes a top priority for medical research.

**CONCLUSION**

***How will I conclude the lesson?***

- Review from Lesson 1, the details of the Seven Sentence Story Structure from their Thoughtbook.
    - Remind students to continue to add to their stories using material from this lesson, as well as previous Insulin100 lessons.

**My Reflections on the Lesson**

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



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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.



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