

Inquiry Demonstration Plan

Lesson Title: <u>Plastic Pollution</u>	Lesson # <u>2</u>	Date: <u>March 31, 2021</u>
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Rationale & Overview

Why does this topic matter to students?

This topic can create curiosity among the learners around plastics they use in their daily lives, understand the challenges; how it impacts us as well as our environment/natural wildlife, analyze the options in designing the alternate ways to reduce plastic use, develop investigating skills or connect dots with their surroundings. This topic has immense potential to sensitize the young learners about this ongoing problem leading to destruction of human as well as wildlife. This topic of investigating on given resources will help the students to develop critical thinking skills and hypothesis by analyzing the current issues related to this environmental problem. It will help them to get aware about the real world issues out of the school environment. Through this lesson, the students will learn about the prevalence of plastics and its adverse impacts on our lives.

How does this lesson fit within the larger inquiry project?

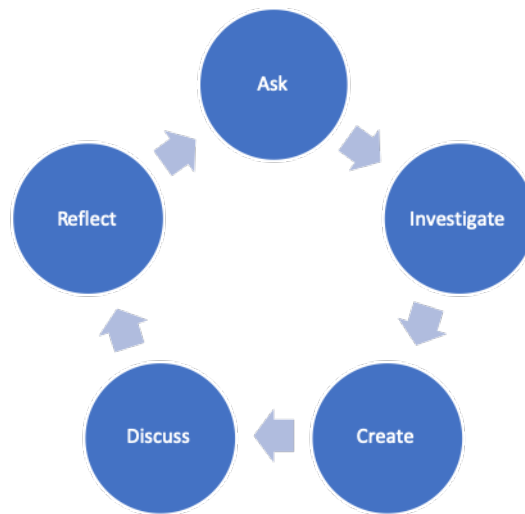
This lesson is the second phase of inquiry cycle, where students will investigate and hypothesize on the findings of the resources provided by the instructor. Further, fostering analytical skills where they analyze the data collected and relate their basic understanding about plastics from previous classes with the possible solutions they will be creating in the last phases of the project.

How does this project incorporate the inquiry cycle?

This is the investigative phase of inquiry cycle, where the main idea behind the research topics is to incorporate provocative inquiry to make students curious about the ongoing problem with shocking facts about the fast growing usage of plastics in our daily lives. This topic will ignite inquiries, enliven the engagement of students in the topic and further the investigative skills to bring out the immense potential of critical thinking among the students.

Key Questions for Inquiry

Core Question & Supporting Questions for Inquiry Project	Question(s) Addressed in This Lesson
How does plastics affect our natural surroundings and impact our present and future?	<ol style="list-style-type: none"> 1. How plastic use contribute towards carbon foot printing? 2. How plastics are a threat to humans and wildlife?



Inquiry Approach and Rationale

The inquiry approach used here in this lesson is mainly design thinking keeping in mind the human centered principles while keeping students in focus. The activities are planned in various stages- Empathize, Define, Ideate, Prototype, and Test. (Ramunas Balcaitis, 2019)

In this lesson, the second and third phase of connecting the learners to the problem of plastics will be taken care.

Define: After the observations are collected about the topic, the learners will synthesize the ideas to understand the problem of plastic pollution. This stage will help the learners to gather information, features about the problem and come out with the possible solutions.

Ideate: At this stage, the learners will start generating ideas about the possible solutions to reduce this problem of plastic pollution and expand their horizons to bring forward creative ideas to design alternative methods to reduce plastic use.

Rationale

In this lesson, the students will be able to make judgements about the provided resources related to the topic, analyze and record their observations related to the images, articles, and pictures given in the resources. Group discussion in the class after completing their investigative report, will help the students to organize the concepts according to their importance with the help of peer feedback.

Core Principles of Effective Teaching (Sharon Friesen) Focus on one or more core principles in the lesson

Core Principle 2: The work that students are asked to undertake is worthy of their time and attention, is personally relevant, and deeply connected to the world in which they live.
**What makes this inquiry valuable, meaningful, and “alive” for the students and teachers?*

This inquiry phase of investigation will help students to connect with the previous knowledge and the actual situation in the world through research articles. Subsequently, the group discussions will develop the skills of debating with logical argument over the topic and observations collected. The teacher’s role here would be as a guide to provide the topics for research and it will be mix of controlled and guided inquiry, where the resources provided will be from the teacher, but the students have full freedom to present their

	<p>facts and ideas related to the topic.</p> <p>The students will identify, gather, and reason with facts to justify and support one and another's interpretations, predictions, arguments, and explanations on the related research topic which will help develop divergent thinking among students.</p>
<p>Core Principle 3: Assessment practices are clearly focused on improving student learning and guiding teaching decisions and actions.</p> <p><i>*How do I define learning and success in this inquiry? How learning is expressed and articulated in peer, self and teacher assessments?</i></p>	<p>The teacher will provide a rubric for the entire project and students will do self-assessment and peer assessment based on the rubric given. This will help students identify their strengths and weakness and make plans of improvement in their future work.</p> <p>The peer assessment in group discussions will help students to develop sense of responsibility and confidence to one another and to the work.</p>

BC Curriculum Core Competencies

Communication	Thinking	Personal & Social
<p><u>Collaborating</u> Effectively recognize how combining others' perspectives, strategies, and efforts with their own enhances collective understanding, use, and impact. They value the contributions of group members, interact supportively and effectively using inclusive practices, and strive for shared commitment and mutual benefit.</p>	<p><u>Critical and Reflective Thinking</u> They reflect on the information they receive through observation, experience, and other forms of communication to solve problems, design products, understand events, and address issues. And uses their ideas, experiences, and reflections to set goals, make judgments, and refine their thinking.</p>	<p><u>Social Awareness and Responsibility</u> Focuses on interacting with others and the natural world in respectful and caring ways. It contributes positively to their family, community, and environment; empathizes with others and appreciates their perspectives; resolves problems peacefully; and develops and sustains healthy relationships.</p>

BC Curriculum Big Ideas (STUDENTS UNDERSTAND)

<ul style="list-style-type: none"> ✓ Human actions that affect natural environment with the use and disposal of plastics. <ul style="list-style-type: none"> i) How much plastic do we use and dispose every day? ii) Where does the plastic you disposed go and what happens after that? ✓ Human activities that create plastic pollution and sensitivity towards self as well as social awareness about the problem. <ul style="list-style-type: none"> i) What are some of the activities that cause plastic pollution? ii) How does plastic abuse affect the quality of our life?

BC Curriculum Learning Standards (STUDENTS DO)

(STUDENTS KNOW)

Learning Standards - Curricular Competencies	Learning Standards - Content
<p><i>How much plastic waste do you generate in a day?</i></p>	<p>Bio-indicators: Effect of disposal of plastics on plants, animals and</p>

<p><u>Planning and conducting</u> Collaboratively and individually plan, select, and use appropriate investigation methods to collect reliable data (qualitative and quantitative)</p> <p><i>How can you measure the carbon foot printing and emission of harmful greenhouse gases with the use of plastics?</i></p> <p><u>Processing and analyzing data and information</u> Experience and interpret the local environment. Analyze cause-and-effect relationships.</p> <p><i>How can you relate population growth with the plastic pollution? How has the plastic disposal per family changed over 10 years?</i></p>	<p>human life.</p> <p>Changes to climatic ecosystems: Release of greenhouse gases Different types of pollution</p>
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BC Curriculum Indigenous Connections/ First Peoples Principles of Learning

How will I incorporate Indigenous knowledge and principles of learning?

The investigative research and reflections from students on human activities causing plastic pollution will help them to incorporate the learning principles from indigenous knowledge by bringing their experiences from local communities about the usage of plastics in common households and produce logical argument about the use of plastics.

Respectful Relations

How will I invite students of all backgrounds, interests and skills into the inquiry?

The students through this activity will examine things from different perspectives and alternate point of views from their peers further balancing conflicts and interests from difference in cultural backgrounds or ideas and events. This will promote collaborative team work among students of various intellectual ability and multicultural backgrounds.

Lesson Activities

Time Allotted		Teacher	Students
Invitation	5 minutes	The teacher will initiate the lesson by introducing students with various facts about the current situation of plastics around the world with the help of pictures and statistical data.	The students will provide their inputs and ideas related to the topic.
Inquiry	20 minutes	The teacher will further provide links to each group of three students to investigate on the given article and	Students will engage themselves in critical thinking and generate hypothesis upon the ideas behind the articles and prepare a two minute presentation for

		present their reflections on the given articles.	further discussion.
Reflection & Discussion	20 minutes	The teacher will welcome students with their reflections on the given topic.	Students will share their views and reflections on the topic one by one further discussing the relevant ideas and explorations with logical arguments related to the topic.

Materials and Resources

Materials Required:

Teacher’s resources

- ✓ Our World in Data *Plastic pollution*. (2018, September)
- ✓ Photos of animals navigating a world of plastics.

Research topics for students

(Great Pacific garbage patch, 2020)
(Walking the Watershed, National Geographic Society, 2012)
(Marine Debris, National Geographic Society, 2012)
(Why do animals eat plastic? National Geographic Society, 2019)

Assessment Rubrics for self-assessment

Key Questions	Working on it/Got it	Evidence to support your choice
What predictions have you and your group made for what you think may impact your understanding about the topic so far?		
Have you and your group clearly defined your variables after reading the articles and your discussion on the given topic?		
How did you and your group consider everyone’s opinions? Did you consider multiple perspectives and more than one way of knowing about the topic?		

(‘Classroom assessment and reporting, Building student success’ - B.C. Curriculum)

Assessment Rubrics for peer-assessment

Areas for evaluation	Star/Wish/Question
Explanation of the research topic	
Examples and data shared	
Logical reasoning and relevant argument to the discussion	

Resources

Classroom assessment and reporting. Building student success - B.C. Curriculum. (n.d.). *Curriculum .Building Student Success - B.C. Curriculum.* <https://curriculum.gov.bc.ca/classroom-assessment#supports>

Great Pacific garbage patch. (2020, May 11). International Marine Consultancy. <https://www.imcbrokers.com/great-pacific-garbage-patch/>

National Geographic Society. (2012, April 6). *Walking the watershed.* <https://www.nationalgeographic.org/article/walking-watershed/>

National Geographic Society. (2012, October 9). *Marine debris.* <https://www.nationalgeographic.org/encyclopedia/marine-debris/>

National Geographic Society. (2020, August 21). Introducing the plastic problem. <https://www.nationalgeographic.org/activity/introducing-plastic-problem/>

Photos of animals navigating a world of plastic. (2018, June 29). National Geographic. <https://www.nationalgeographic.com/photography/proof/2018/06/animals-wildlife-plastic-pollution/>

Plastic pollution. (2018, September). Our World in Data. <https://ourworldindata.org/plastic-pollution#which-countries-produce-the-most-plastic-waste>

Ramunas Balcaitis. (2019, June 17). *Design thinking models.* Stanford d.school. Empathize IT. <https://empathizeit.com/design-thinking-models-stanford-d-school/>

Why do ocean animals eat plastic? (2019, December 5). National Geographic. <https://www.nationalgeographic.com/animals/2019/12/whales-eating-plastic-pollution/>

Organizational Strategies

- ✓ Small group discussions.
- ✓ Teaching as a facilitator not expert or lecture

Proactive, Positive Classroom Learning Environment Strategies

- ✓ Clear communication between teacher-student and student-student
- ✓ Collaborative team building activity to respectfully accept one another's ideas and interests.

Extensions

Exit Slips

Write one question you have after today's class.