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|  **Overall Expectations** | **Specific Expectations**  |
| A1. Demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analysing and interpreting, and communicating) A2. Identify and describe careers related to the fields of science under study, and describe the contributions of scientists, including Canadians, to those fields B1. Analyse social and economic issues related to an environmental challenge, and how societal needs influence scientific endeavours related to the environment E3. Demonstrate an understanding of the nature and types of waste and strategies for its management E2. Investigate the effectiveness of various waste management practices E1. Analyse economic, political, and environmental considerations affecting waste management strategies  | A1.1 Formulate relevant scientific questions about observed relationships, ideas, problems, or issues, make informed predictions, and/or formulate educated hypotheses to focus inquiries or research A1.5 conduct inquiries, controlling relevant variables, adapting or extending procedures as required, and using appropriate materials and equipment safely, accurately, and effectively, to collect observations and dataA1.12 Use appropriate numeric, symbolic, and graphic modes of representation, and appropriate units of measurements (e.g., SI units, imperial units) A1.11 Communicate ideas, plans, procedures, results, and conclusions orally, in writing, and/or in electronic presentations, using appropriate language and a variety of formats (e.g., data tables, laboratory reports, presentations, debates, simulations, models)A2.1 Identify and describe a variety of careers related to the fields of science under study and the education and training necessary for these careers A2.2 Describe the contributions of scientists, including Canadians, to the fields under study B3.1 Identify some major contemporary environmental challenges, and explain their causes and effects. B3.5 Describe a variety of human activities that have led to environmental problems and/or contributed to their solution E3.4 Explain common strategies and technologies used in the collection and storage of waste E2.3 Use a research process to investigate the waste generated throughout the life cycle of a product E2.4 Plan and conduct a waste audit within their school, and purpose a plan of action for waste reduction based on their findings E2.5 Investigate a local, regional, national or global waste management practice, and communicate their findings E2.1 Use appropriate terminology related to waste managementE1.2 Evaluate the short-term and long-term impact on the environment of a specific type of waste  |
| **Concepts** |
| **Terminology** | **Theory** |
| * Polymer
* Temperature
* Decaying
* Management
 | * Organic molecules
* Waste
* Plastic
 | * Hydrocarbon
* Organic molecules
* Functional grouping
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| **Material to prepare** |
| * Computer
* Copy of case study: Are bioplastics the solution?
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| **Context*** Present a video or an article on plastics production
* Present the video: **Du pétrole au plastique** [<https://www.youtube.com/watch?v=P9UvzH02o-A>]
* Present the video: **Comment c’est fait, Les sacs de plastique** [<https://www.youtube.com/watch?v=ofs2xm9omH8>]
* Discuss the characteristics of plastics and the decaying process
* Present the video: **Microplastique comment se forment-ils?** *[* [*https://youtu.be/1aZSXiaBxnQ*](https://youtu.be/1aZSXiaBxnQ) *]*
* Article from Let’s Talk Science; *We use a lot of plastic [*[*https://letstalkscience.ca/educational-resources/stem-in-context/we-use-a-lot-plastic?\_ga=2.66138030.1609200711.1623354680-2138215416.1622830676*](https://letstalkscience.ca/educational-resources/stem-in-context/we-use-a-lot-plastic?_ga=2.66138030.1609200711.1623354680-2138215416.1622830676)*]*
* Presentation of research assignment
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| **Activity - Research on bioplastics*** Research and oral presentation
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| **Pushing further*** Create signs to encourage the recycling of plastic in your school
* Create podcasts to be played during morning announcements
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| **Assessment** * Summative: Research and oral presentation on bioplastics
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| **Resources*** **Case study: Are bioplastics the solution?**
* **Assessment grid \_Bioplastics**
* Internet
* [Accros au plastique](https://plus.lapresse.ca/screens/1ea2e0ef-3ada-49f0-bd66-7c40cae394eb__7C___0.html) *[*[*https://plus.lapresse.ca/screens/1ea2e0ef-3ada-49f0-bd66-7c40cae394eb\_\_7C\_\_\_0.html*](https://plus.lapresse.ca/screens/1ea2e0ef-3ada-49f0-bd66-7c40cae394eb__7C___0.html)*]*
* [Peut-on se passer des plastiques](https://synchronex.ca/nouvelles/peut-on-se-passer-des-plastiques-dans-lemballage%E2%80%89/) *[*[*https://synchronex.ca/nouvelles/peut-on-se-passer-des-plastiques-dans-lemballage%E2%80%89/*](https://synchronex.ca/nouvelles/peut-on-se-passer-des-plastiques-dans-lemballage%E2%80%89/) *]*
* The 100 % biodegradable packaging is coming soon *[*[*https://www.bpkpackaging.com/2018/09/05/the-100-biodegradable-packaging-is-coming-soon/*](https://www.bpkpackaging.com/2018/09/05/the-100-biodegradable-packaging-is-coming-soon/)*]*
* [4 innovations de l’industrie agroalimentaire](https://www.cartoffset.com/4-innovations-de-lindustrie-agroalimentaire-pour-reduire-le-plastique-dans-nos-emballages/)  *[*[*https://www.cartoffset.com/4-innovations-de-lindustrie-agroalimentaire-pour-reduire-le-plastique-dans-nos-emballages/*](https://www.cartoffset.com/4-innovations-de-lindustrie-agroalimentaire-pour-reduire-le-plastique-dans-nos-emballages/)*]*
* Innovating dairy packaging until the cows come home  [*[*](https://tctranscontinental.com/fr-ca/emballages/marches/fromages-et-produits-laitiers)[*https://tctranscontinental.com/en-ca/packaging/markets/cheese-dairy*](https://tctranscontinental.com/en-ca/packaging/markets/cheese-dairy)*]*
* [Bioplastique et plastique fossile](https://fliphtml5.com/mjnth/edzm/basic) *[*[*https://fliphtml5.com/mjnth/edzm/basic*](https://fliphtml5.com/mjnth/edzm/basic)*]*
* Food packaging *[*[*https://www.cascades.com/en/products-services/packaging/food-packaging*](https://www.cascades.com/en/products-services/packaging/food-packaging)*]*
* [Les résidus de filtration](https://www.laterre.ca/du-secteur/formation/les-residus-de-filtration-du-lait-valorises) *[*[*https://www.laterre.ca/du-secteur/formation/les-residus-de-filtration-du-lait-valorises*](https://www.laterre.ca/du-secteur/formation/les-residus-de-filtration-du-lait-valorises)*]*
* [Bioplastique Lactips](https://www.agro-media.fr/tag/bioplastique) *[*[*https://www.agro-media.fr/tag/bioplastique*](https://www.agro-media.fr/tag/bioplastique)*]*
* Un plastique compostable fait de déchets *[*[*https://novae.ca/un-plastique-compostable-fait-de-dechets/*](https://novae.ca/un-plastique-compostable-fait-de-dechets/)*]*
* Milk-based plastics to reduce environmental damage*[*[*https://cordis.europa.eu/article/id/254165-milkbased-plastics-plastics-to-reduce-environmental-damage*](https://cordis.europa.eu/article/id/254165-milkbased-plastics-plastics-to-reduce-environmental-damage)*]*
* [Du bioplastique made in Québec](https://unpointcinq.ca/economie/bioplastique-compostable-quebec/) *[*[*https://unpointcinq.ca/economie/bioplastique-compostable-quebec/*](https://unpointcinq.ca/economie/bioplastique-compostable-quebec/)*]*
* [Les bioplastiques biodégradables](https://www.emballagesmagazine.com/mediatheque/2/9/0/000035092.pdf) *[*[*https://www.emballagesmagazine.com/mediatheque/2/9/0/000035092.pdf*](https://www.emballagesmagazine.com/mediatheque/2/9/0/000035092.pdf)*]*
* [Remplacer les agents de conservation chimiques par un biofilm fonctionnel aux propriétés antimicrobiennes, antioxydantes et bioréactives.](https://www.cbc.ca/news/canada/nova-scotia/cape-breton-researchers-looking-into-plastic-that-kills-covid-19-1.5633150) [[*https://www.cbc.ca/news/canada/nova-scotia/cape-breton-researchers-looking-into-plastic-that-kills-covid-19-1.5633150*](https://www.cbc.ca/news/canada/nova-scotia/cape-breton-researchers-looking-into-plastic-that-kills-covid-19-1.5633150)*]*
* In search of a natural solution against spoilage bacteria and frozen pathogens in poultry and frozen vegetable products [<https://canadianfoodinnovators.ca/project/in-search-of-a-natural-solution-against-spoilage-bacteria-and-pathogens-in-poultry-and-frozen-vegetable-products>]
* [50 raisons de dire non au plastique](https://www.selection.ca/sante/vivre-sainement/50-raisons-de-dire-non-au-plastique/) *[*[*https://www.selection.ca/sante/vivre-sainement/50-raisons-de-dire-non-au-plastique/*](https://www.selection.ca/sante/vivre-sainement/50-raisons-de-dire-non-au-plastique/)*]*
* Manufacturer of packaging made of wood, cardboard and plastic *[*[*https://www.groupe-lacroix.com/en/*](https://www.groupe-lacroix.com/en/)*]*
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