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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)B3. Demonstrate an understanding of the diversity of living organisms in terms of the principles of taxonomy and phylogenyB2. Investigate, through laboratory and/or field activities or through simulations, the principles of scientific classification, using appropriate sampling and classification techniquesC1. Analyse the economic and environmental advantages and disadvantages of an artificial selection technology, and evaluate the impact of environmental changes on natural selection and endangered species | A1.3 Identify and collect a variety of print and electronic resources that enable them to address research topics fully and appropriately A1.2 Select appropriate instruments (e.g., sampling instruments, a microscope, a stethoscope, dissection instruments) and materials (e.g., dichotomous keys, computer simulations, plant cuttings), and identify appropriate methods, techniques, and procedures, for each inquiry A1.12 Use appropriate numeric, symbolic, and graphic modes of representation (e.g., biological diagrams, Punnett squares), and appropriate units of measurements (e.g., SI and 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)B3.5 Explain why biodiversity is important to maintaining viable ecosystems (e.g., biodiversity helps increase resilience to stress and resistance to diseases or invading species) B2.3 Use proper sampling techniques to collect various organisms from a marsh, pond, field, or other ecosystem, and classify the organisms according to the principles of taxonomyB2.1 Use appropriate terminology related to biodiversityC3.2 Explain the process of adaptation of individual organisms to their environment |
| **Concepts**  |
| **Terminology** | **Theory** |
| * Microorganism
* Phylogeny
* Ecosystem
 | * Binomial nomenclature
* Taxon
* Biodiversity
 | * Classification principles
* Taxon organization (KPCOFGS)
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| **Material to prepare**  |
| * Computer for research
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| **Context*** Define an ecosystem
* Are microorganisms part of ecosystems?
* Do microorganisms interact with other organisms?
* What is the role of microorganisms?
* Do you think we can consider the species and population of microorganisms as we would consider the species and population of wolves?
* Present the transformation process involved in the creation of cheese
* Read the article from Terre de chez nous : [L’authenticité de nos fromages sous la loupe des chercheurs](https://docs.google.com/document/d/1X29Awr4HkA4cdhgBYfU9aLbeCiNQ8LhP/edit)
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| **Activity*** Identify a microorganism present in each environment presented in the case study **(see document\_microbiomes)**.
* Fill out an identity sheet for each microorganismes identified according to the phylogenie principles.
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| **Pushing further*** Organiser une dégustation de fromages provenant de différents terroirs afin de démontrer l’importance de l’écosystème dans le développement des saveurs d’un fromage.
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| **Assessment*** Formative — feedback — discussion
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| **Resources*** A few microorganisms used in the ripening of cheese
* Internet
* [Des bactéries et des moisissures dans le fromag](http://androuet.com/print-article.php?id=28)e [[*http://androuet.com/print-article.php?id=28*](http://androuet.com/print-article.php?id=28)]
* Canadian Food Inspection Agency[[*https://www.canada.ca/en/public-health/topics/food-safety-monitoring-surveillance.html*](https://www.canada.ca/en/public-health/topics/food-safety-monitoring-surveillance.html)]
* [Les microorganismes intervenant dans l’affinage des fromages à pâte lactique](http://bergers-fromagers.org/public/Technique/Production-Transformation/MICROFLORE_-_Les_micro_organismes_dans_affinage_des_fromages_a_pate_lactique.pdf)[[*http://bergers-fromagers.org/public/Technique/Production-Transformation/MODULE\_2\_-\_Rendement\_fromages\_lactiques.pdf*](http://bergers-fromagers.org/public/Technique/Production-Transformation/MODULE_2_-_Rendement_fromages_lactiques.pdf)]
* [Fromage : les autres microorganismes](https://www.futura-sciences.com/sante/dossiers/gastronomie-lait-cru-pasteurise-tradition-hygiene-1712/page/6/)[[*https://www.futura-sciences.com/sante/dossiers/gastronomie-lait-cru-pasteurise-tradition-hygiene-1712/page/6/*](https://www.futura-sciences.com/sante/dossiers/gastronomie-lait-cru-pasteurise-tradition-hygiene-1712/page/6/)]
* [Mieux comprendre l’activité des levures et des moisissures](http://lait.org/fichiers/Revue/PLQ-2011-06/recherche.pdf)[*http://lait.org/fichiers/Revue/PLQ-2011-06/recherche.pdf*](http://lait.org/fichiers/Revue/PLQ-2011-06/recherche.pdf)*)*
* [Le terroir a-t-il un goût](https://www.sciencepresse.qc.ca/blogue/2010/05/12/terroir-gout) [[*https://www.sciencepresse.qc.ca/blogue/2010/05/12/terroir-gout*](https://www.sciencepresse.qc.ca/blogue/2010/05/12/terroir-gout)]
* [Espèce envahissante](https://www.thecanadianencyclopedia.ca/fr/article/especes-envahissantes-au-canada-plantes#tudedecasAlliaireofficinale)  [[*https://www.thecanadianencyclopedia.ca/fr/article/especes-envahissantes-au-canada-plantes#tudedecasAlliaireofficinale*](https://www.thecanadianencyclopedia.ca/fr/article/especes-envahissantes-au-canada-plantes#tudedecasAlliaireofficinale)]
* Fromages et acariens : les fromages aux artisans,[[*https://www.futura-sciences.com/planete/dossiers/zoologie-acariens-envahisseurs-invisibles-626/page/6/*](https://www.futura-sciences.com/planete/dossiers/zoologie-acariens-envahisseurs-invisibles-626/page/6/)]
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