

A Resource for Teachers

Overview

When educators create rich learning experiences for their students, they engage in the complex act of curricular interpretation and planning. The act of moving from curriculum as written to curriculum as embodied through learning requires thoughtful consideration and continuous design, iteration and revision. Research informed by the learning sciences (Bell, Lewenstein, Shouse, & Feder, 2009), growth mindset (Dweck, 2012), and PISA results (Programme for International Student Assessment, 2012) has shown that what we know about learning and how students learn has changed. As well, the needs of Canadian society, especially in terms of what constitutes a skilled workforce, have changed over the last few decades. These changes require educators to reconsider how students might engage differently with mandated curricular intentions, suggesting a multi-disciplinary and multi-faceted approach to instructional delivery focused on active learning and problem finding and problem solving situated in real world contexts is appropriate.

Design Rationale

Over the past two decades, large Canadian cities such as Calgary have rapidly expanded and diversified their economic bases. Calgary is a city with an ever-growing boundary and a footprint that exceeds New York City—a city with eight times the population of Calgary (Retrieved January 2016, <http://forum.skyscraperpage.com/showthread.php?t=136479>). Calgary's growth has slowly encroached on the natural habitats in the area. As a result, animal habitats in the region are in danger. There is a desperate need to consider the impact of urbanization on the natural environment.

In 2005, the City of Calgary produced a document, *Green Infrastructure In Calgary's Mobility Corridors* (Retrieved January 2016, <https://www.scribd.com/document/215236286/Calgary-Green-Infrastructure-Mobility-Corridors-Sec>). This document is one of many that frame the problem of urban impact on the natural environment. Documents like this help educators to situate general curricular outcomes into relevant local or regional contexts. To make this link, educators need to hone their knowledge, understanding, and consideration of various disciplines and create rich learning opportunities for their students.



Suggested Grade Level

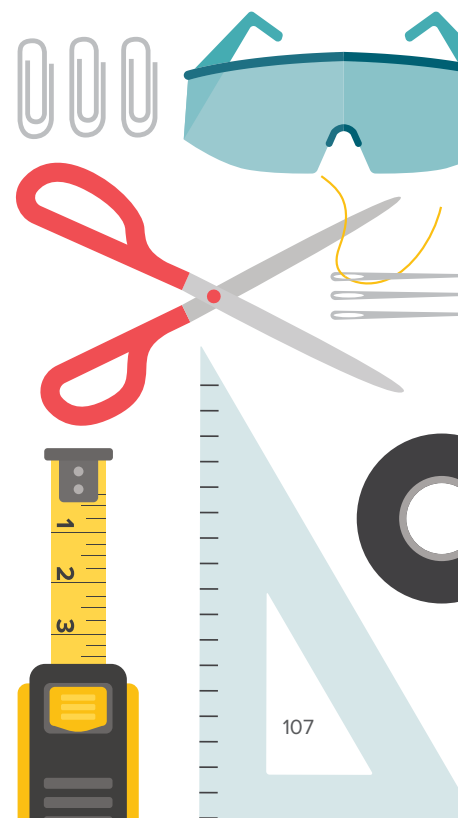
Adults working in elementary through to secondary school

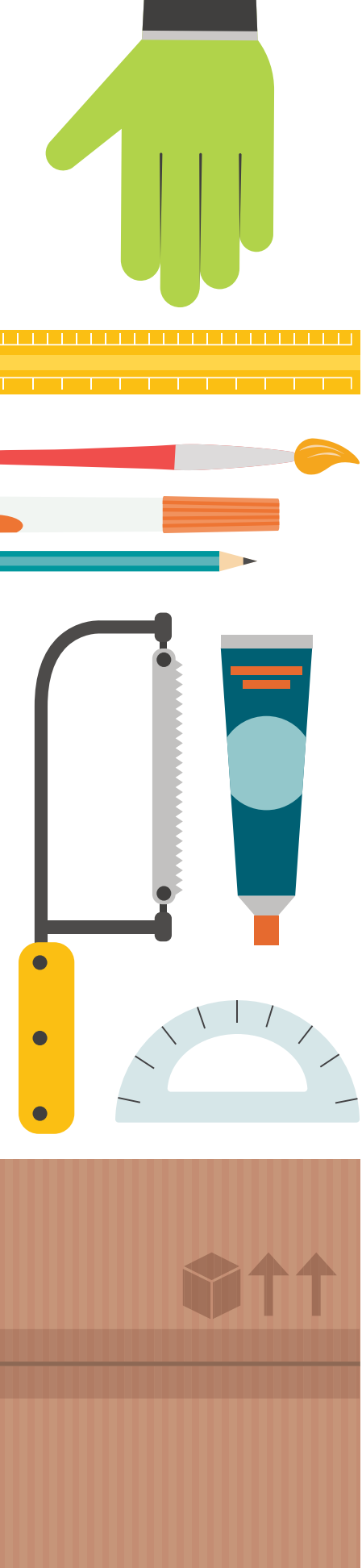
Suggested Audiences

- Directors of Instruction
- Principals
- School-based learning leaders

Suggested Subject Area

- Citizenship—wherever school culture or community is addressed
- Science
- Social Studies





Problem Scenario

The City of Calgary and surrounding areas are in need of your help. Local government offices are seeking innovative solutions to protect the ecosystem that sustains its local animal population. These potential solutions require the integration and synergy of multiple discipline areas, including ecology, biology, animal and human behaviours, natural resources, impact of urbanization and industrialization on rural areas, and economic implications. Proposals should include graphic representation of data analysis and predictions of population changes and patterns.

Your team has two tasks:

1. Create a metaphor⁹ of student learning.
2. Develop a learning experience based on the problem scenario.

Task One: Your team will create a metaphor that illustrates your concept of how students learn. This will be a facilitated process using a human-centred design thinking process, collaborative prototyping, a design charrette¹⁰ and reflection.

Task Two: Your team will design a learning experience for your students that requires them to:

- conduct a needs analysis of the current state of local habitats,
- research and develop strategies for remediation of an affected ecosystem, and
- create an opportunity to present their recommended action plans—possibly to members of the city planners or their local aldermen.

In creating your learning experiences, you need to consider a number of factors that students will need to understand:

- Action plan considers research on all areas that have contributed to the ecological impacts of urban sprawl
- Careful consideration of human factors that have led to the decline of the animal population
- Close consideration of the financial implication of your proposed action plan
- Description of the current state of affairs and potential future scenarios for animal growth based on analysis of data collected
- Identification of a specific animal populations for the students to target in their proposals
- What constitutes a sustainable and viable plan
- What constitutes a viable remediation strategy

⁹ A metaphor is a representation of ideas or concepts in a tangible and often creative or imaginative way. For example, we might use hearts as a metaphor for love, and then tear the heart or pierce it in some way to show angst or heartbreak.

¹⁰ A design charrette invites all participants to stop creating and become critical friends to other groups by asking good, open-ended questions while participating in a gallery tour of all the groups' metaphors.

Success Determinants

Success will be determined by:

- ❑ Clear linkages between curriculum outcomes and local issues
- ❑ Creation of assessment approaches that honour summative and formative learning (Retrieved January 2016 <http://www.learnalberta.ca/content/mewa/html/assessment/types.html>)
- ❑ Creation of engaging hands-on learning that fosters a growth mindset (Dweck, 2012) in students and supports learning innovations suggested by the learning sciences—possibly a 2 or 3 page lesson plan with supporting references and student resources

Parameters

- ❑ You must create a tangible metaphor, using some of all the consumable items in your participant group kit.
- ❑ You must incorporate multiple discipline areas into your lesson plan and resources.
- ❑ You must present formative and summative assessment strategies.

References

Bell, P., Lewenstein, B., Shouse, A., & Feder, M. (2009). *Learning science in informal environments: People, places, and pursuits*. Retrieved January 2016, <http://www.nap.edu/catalog/12190/learning-science-in-informal-environments-people-places-and-pursuits>.

Dweck, C. (April 20, 2012). *Exploring a growth mindset*. Retrieved January 2016, <https://www.youtube.com/watch?v=9hC1DwZS8tl>.

Girling, C., Galdon, M., Davis, L. & R. Kellett. (2005). *Green infrastructure in Calgary's mobility corridors*. Retrieved January 2016, http://www.dcs.sala.ubc.ca/docs/calgary_green_infrastructure_mobility_corridors_sec.pdf.

Programme for International Student Assessment (PISA). (2012). *PISA 2012 results*. Retrieved January 2016, <https://www.oecd.org/pisa/keyfindings/pisa-2012-results.htm>.

