

# EDUCATION FOR INNOVATION

Early Learning – Kindergarten



A Resource Guide for Teachers

[CanadianInnovationSpace.ca](http://CanadianInnovationSpace.ca)



# Fondation Rideau Hall Foundation

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This resource guide includes text adapted from *Ingenious* by the Right Honourable David Johnston and Tom Jenkins, published by Signal, a Division of Penguin Random House Canada, copyright © 2017, used with permission. It also includes text and illustrations adapted from *Innovation Nation* by the Right Honourable David Johnston and Tom Jenkins and illustrated by Josh Holinaty, published by Tundra Books, an imprint of Penguin Random House Canada Young Readers, copyright © 2017, used with permission.

This resource is available for download free of charge to teachers and other facilitators to lead learning activities to develop knowledge, skills and mindsets related to innovation.

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## Preamble

Through exploration and inquiry, which are implicit in play, young children are able to make meaning of their world by identifying problems, asking questions, creating solutions, testing ideas and engaging in critical thinking. The current imperative to provide learning experiences promoting innovation among young people is evident in education policies across Canada and internationally.

This Early Learning/Kindergarten Innovation Resource provides a range of activities to cultivate familiarity with Canadian innovations as well as to develop innovative thinking and learning skills in young learners. Through project-based opportunities and design thinking experiences, the activities, materials, and strategies are intended to be used as provocations to introduce and reinforce the concept and cycle of innovation. This resource is aligned with 21st Century learning and global competencies.

The key phases of the Innovation Cycle that are explored with young children through various experiences are:

Ask/Inquire  
INQUIRE

Plan/Create  
IDEATE

Test/Improve  
INCUBATE

Share/Celebrate  
IMPLEMENT

The innovation phases are cyclical and repetitive. It is implied that within each phase of the cycle certain ideas for innovations are being investigated, researched, created, improved, communicated, and celebrated.

### What is Innovation?

Innovation requires the ability to look at something in new and interesting ways. Innovation may not always result in new or unique products or processes. It is important for children to see that they can also improve on an existing item (product) or action (process) as part of an innovation experience. There are many definitions of innovation. The definition used throughout the Education for Innovation resource is:

Innovation is the creation or improvement of a product (item) or process (actions) in order to make a positive different (impact).

The definition which can be used with young children is below.

**Innovation is creating or improving a thing (product)  
or action (process) to make a difference (impact).**

For example, innovation may result in the following differences or impacts:

- A product that is more efficient, compact, interesting, aesthetically pleasing, safer or less fragile.
- A process that is easier to understand, more accessible, safer, more environmentally responsible, or more accurate.

Children are engaging in innovative thinking and actions when they do any of the following:

- Ask or respond to questions such as “what if ...?” or “what happens when ...?”
- Take risks to try something new or use materials or tools in a different way.

- Try a novel approach to solving a problem after finding that something does not work.
- Modify a structure or building to make it better or safer.
- Test a structure or mechanism and make changes to improve how it works.
- Explain their thinking regarding a change or adjustment.
- Make changes to materials or resources in the learning environment to meet their needs (e.g., move chairs, recreate a name wall when writing in the dramatic play area)
- Design and make tools or toys for a specific purpose.
- Create music, visual art, or dances, and make improvements to them.
- Design and create items to use in their dramatic play such as setting up a store, museum or theatre.
- Test their theories and persevere in their attempts to solve a problem.
- Use a variety of attributes when sorting or patterning.
- Transfer skills learned in one context to another.
- Collaborate with peers to create and modify things by connecting ideas.
- Consider someone else's perspective when making adaptations and improvements.

Therefore, innovation for young children is a natural process involving the engagement in a mindset of constant improvement and enhancement. Innovative thinking happens seamlessly in various experiences that are not specific to a particular area or topic in the Early Learning-Kindergarten program. Innovations are usually created with the integration of various ideas and with an interaction with a range of collaborators. The full cycle of innovation includes such processes as inquiring, investigating, planning, creating, testing, improving, sharing, and celebrating the positive difference made by the innovation.

### **How to Use the Early Learning/Kindergarten Innovation Resource**

This resource is intended to celebrate and cultivate the innovative nature of young children. It provides educators, in a range of settings such as schools, homes, and childcare programs, with suggested learning experiences intended to foster an innovator's mindset and innovative actions.

The learning experiences have been designed to foster creativity, wonder, curiosity, perseverance, and risk-taking. Educators are encouraged to expand upon the ideas presented in this resource by exploring children's interests, questions, and wonderings. The learning experiences follow the phases of the Innovation Cycle and include related materials, suggested pedagogical approaches, educator prompts, and links to the Innovation Centre (Appendix 3C) and the Innovation Tower. Each learning experience can be offered for various periods of time and can be revisited and revised as deemed appropriate by educators, in consultation with participating children who can also provide valuable input and feedback. The Innovation Space is an area of activity with materials to engage children in the processes of inquiring, planning, creating, testing, improving, and sharing. It can also be referred to as an Innovation Centre or Innovation Station. An Innovation Space may be an extension of an existing Makerspace. The Innovation Tower is a collection of artifacts and evidence of innovative thinking and children's innovative products. Follow-up suggestions are intended for consolidation, review, and reflection. The templates provided in each Learning Experience may be used in a variety of formats including individually, or in a group setting as provocations for discussions, brainstorming, or gathering data.

Throughout this resource, young children are invited to explore and learn more about Canadian innovations, thus becoming inspired as future innovators themselves. Examples of Canadian innovations can be drawn from a range of sources including the books *Innovation Nation* and *Ingenuous: How Canadians Made the World Smarter, Smaller, Kinder, Safe, Healthier, Wealthier*, and

Happier, both of which were co-written by the Right Honourable David Johnston and Tom Jenkins. These books include numerous stories of Canadian innovations and their impact on the world.

The Early Learning-Kindergarten resource refers to the adult/teacher as an educator and to the students/learners as children. The Pedagogical Approaches provided reflect a myriad of suggestions and should be adapted and adjusted as deemed appropriate by educators. For example, educators can introduce Canadian Innovations through various literacy opportunities (alphabet: M= Maple Syrup). The terminology related to innovation should be used by educators in natural contexts with explanations and synonyms provided as necessary. It is expected that young children will use the terms that are introduced by the educators and will transfer their innovative thinking and knowledge to various settings in the classroom, home, and community. Since innovation is integral to our society, it is anticipated that young children will be excited and enthused to engage in innovative learning experiences.

As a culminating activity, learners are invited to create an Innovation Project, in groups or as a class project. An Innovation Celebration event may showcase the innovations created by children. Canadian Innovation Week, held annually in the month of May, provides a forum for Innovation Celebrations. Included within this resource is a Curriculum Tracking Grid to record children's learning as demonstrated through innovation and problem-solving experiences.

### **Canadian Innovation Space Website**

Educators are invited to visit the Canadian Innovation Space Website for videos, class examples, testimonials, and further information: <https://canadianinnovationspace.ca>

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# Learning Experience 1: What is an Innovation Space?

## Background

The Innovation Space consists of a variety of materials that allow children to inquire, plan, create, test, share and celebrate their innovations. It can also be referred to as an Innovation Centre or Innovation Station. The Innovation Space is an expansion of the Makerspace concept, allowing for the creation and celebration of the innovative processes and products. Children may use the Innovation Space to design improvements to items and new ways of doing things. The materials are generated by both the educators and children, and they will fluctuate depending on the needs and interests of the users. Many of the suggested materials are recycled, and are intended for planning and making innovations. Educators may encourage children to consider items that are available throughout the classroom, as well as objects that are collected from the home or community, to include in the centre. All materials should be easily accessible and available for the creation phase. The Innovation Space will ideally include adequate space (table and floor) for exploring, experimenting, designing and collaborating. An Innovation Space can also be an area where child-created innovations are featured and displayed. The Innovation Space is cross-curricular and includes materials from the arts, physical education/health, literacy, mathematics, science, and technology. Examples of Canadian innovations (e. g. zipper, basketball, replicas of canoes, life jacket, snowshoes, maple syrup, McIntosh apple, phones, and light bulb) can be showcased for exploration. If space is limited, the Innovation Space could be located in the library of the school or in a central location. Some educators may choose to create a virtual Innovation Space for displaying and celebrating children's innovations.

## Materials

- Samples of Canadian innovations (The innovations could be diverse or could be grouped to represent a topic such as transportation, food, communications, health and safety, toys)
- Samples of books about innovation (e.g. *Innovation Nation*, *Rosie Revere*, *Engineer*, *Not Just A Box*)
- Recycled materials: wrapping paper, wallpaper, plastic containers and lids, paper rolls, twist ties, string pieces, Styrofoam, wooden pieces, popsicle sticks, straws, egg cartons
- Arts materials: glue, paper clips, pieces of Velcro, tape, string, elastic bands pompoms beads, bells, bingo dabbers, gel bags, paper, clipboards, Post-It Notes, cards, small white boards or chalkboards, markers, pencils, pens, crayons, pencil crayons, paint
- Building materials: marbles, discs, wheels of varying sizes, toothpicks, tubes, plasticine or playdough and other building materials drums
- Natural materials: twigs, rocks, stones, shells, sand, feathers
- Technology: Tablet or laptop for research/showing videos, use of D2L, printer, 3D Printer, digital cameras, magnifying glass, microscope, etc.
- Innovations created by children in the class
- Innovation Tower ([Appendix 1A](#))

## Pedagogical Approaches

- Introduce an Innovation Space by bringing children to sit in front of the centre. *Prompts: We have something new today in our classroom. Did anyone notice the Innovation Space? What do you think we can do there? What would you like to add to the Innovation Space?*
- Encourage children to explore materials at the Innovation Space and use them in an open-ended manner.

- Show children samples of Canadian innovations in the centre for discovery and investigation.
- Explain they will be learning about how to be an innovator while exploring and building in the centre. Inspire the children to make something new or make something better!
- Videotape children's actions and innovations from the class on an ongoing basis and show the video to the visitors to the Innovation Celebration.
- Parental Engagement: include photos, videos of the children at the Innovation Space on school, classroom websites.

### **Innovation Tower**

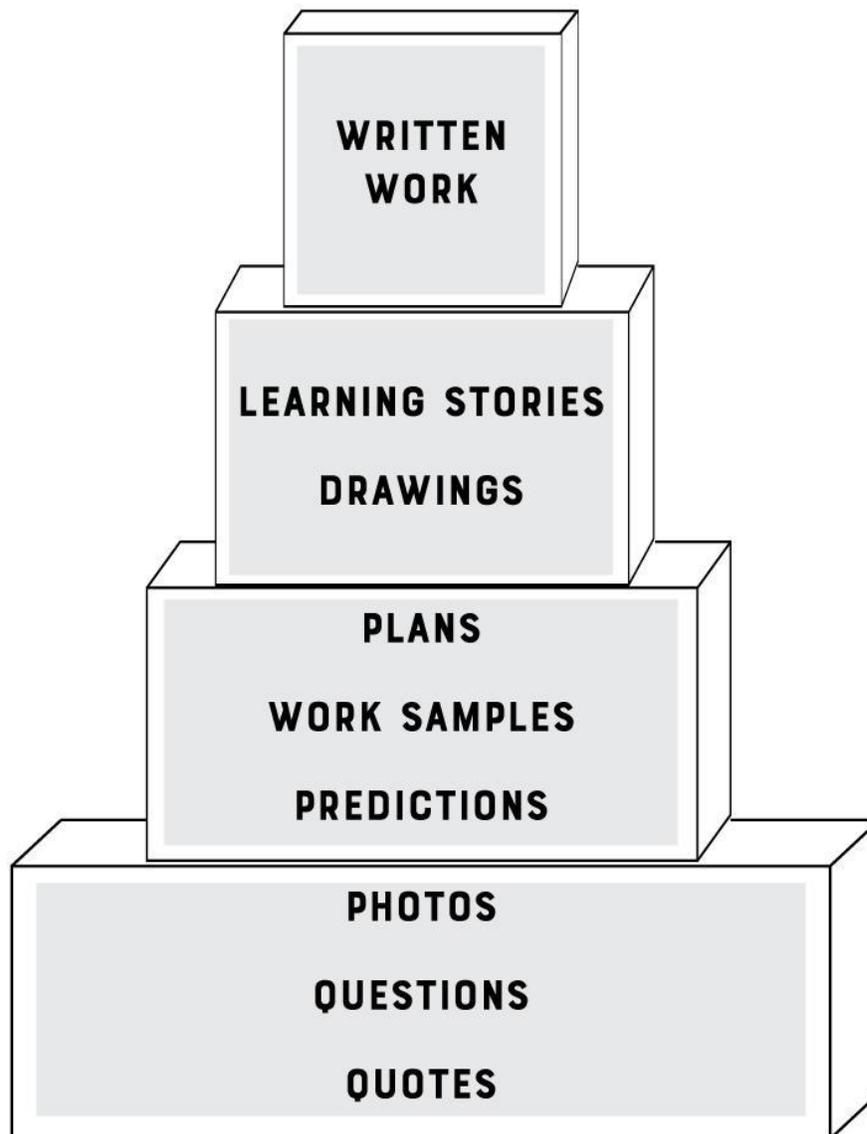
- Place the tower near the Innovation Space as a means of recording and showcasing innovative learning experiences. Placing it near the Innovation Space allows for association and easy transfer of learning.
- Introduce the tower to children at the same time as the Innovation Space.
- Collaborate with children to provide sample innovations for the tower (samples include learning stories, photos, child quotes as well as questions and ideas.)
- Review artifacts during the daily follow-up to celebrate the learning.
- Move the tower around the room or school when it has collected a number of artifacts and evidence of innovation.

### **Follow-Up**

- Share observations with children on how they worked with materials at the Innovation Space (e.g. initiating, problem-solving, showing perseverance and creativity).
- Review any items or artifacts that were placed on the Innovation Tower.

## Innovation Tower

The Innovation Tower is a portable documentation tower made up of different sized boxes. It visually represents the learning experiences of the children throughout the innovation process. Educators and children can attach documentation samples (photos, learning stories, child quotes, child work samples, questions, predictions etc.) to all sides of the boxes. Samples of innovations created by the children can be placed along the ledges. The tower can be moved around the classroom when/where needed, and used during the daily follow-up group activity.



## Learning Experience 2: What is Innovation?

### Background

This learning experience begins to familiarize young children with the terms and processes related to innovation. To introduce the concept of innovation, the educator can read a story about innovation or show an appropriate video about innovation. Children are invited to think about the word innovation and examine items that might be considered innovations in their world. It is important to note that many resources for young children use the term invention. Educators can explain the difference between an invention and an innovation. An invention is the creation of a new thing. An innovation is the creation OR improvement of an item OR action to make a positive difference (impact). An innovation is broader in scope than an invention. The key phases of innovation for young children are: Inquire, Plan, Test and Share. They are colour-coded and associated with an image to facilitate understanding.

### Materials

- *Rosie Revere, Engineer* by Andrea Beaty: <https://www.youtube.com/watch?v=A4r8vTxeLcU>  
Description: Rosie may seem quiet during the day, but at night she's a brilliant innovator of gizmos and gadgets who dreams of becoming a great engineer.  
*Prompts: Why did Rosie make her creations? What made her think about creating these ideas?*
- Definition of Innovation to post in the Innovation Space ([Appendix 2A](#)).
- Word cards or chart paper, to begin a collection of words related to innovation: e.g. ask, inquire, ideas, create, make, share, test, fix, improve, share, and celebrate ([Appendix 2B](#)).

### Pedagogical Approaches

- Read *Rosie Revere, Engineer* by Andrea Beaty
- Invite the children to share experiences they have had trying to create something in class or at home.  
*Prompts: Have you tried to create anything? Why did you decide to create it? What did it do? Did you have to fix it after you tried it? How is an innovation different from an invention? Could we innovate some areas of our classroom or some routines?*
- Explain the difference between an invention and an innovation. An invention is the creation of a new item. An innovation is the creation OR improvement of an item or process. An innovation is broader in scope than an invention.
- Point out that children are innovators too, just like Rosie! Rosie Revere is an innovator who uses her imagination to come up with different ideas, and create many interesting and helpful things.
- Begin to record words that children associate with innovation on cards or chart paper. (See samples in [Appendix 2B](#))
- Share the definition of Innovation: “Innovation is creating or improving a thing or action to make a difference. “
- NOTE: Rosie Revere’s creations are innovations because: her creations have a specific purpose; there is a reason why she creates them; she uses her imagination to design a gadget that is supposed to solve a problem and make something better; she continues to improve her creations until they work just right!
- Explain that innovations are not only objects. They could be new ways of doing things such as a new routine for snacks or a new configuration of furniture in the classroom.

### Innovation Space

- Support the Innovation Space as a hub of activity related to Innovation
- Encourage children to make use of the centre.
- Post the definition of Innovation along with photos of Rosie's creations or innovations. Children can continue to explore materials and samples of Canadian Innovations at the Innovation Space.  
*Prompts: How is the Innovation Space related to Rosie's adventures? What can you do at the Innovation Space? What would Rosie do with the materials at the Innovation Space? How can we make the Innovation Space more innovative?*

### Innovation Tower

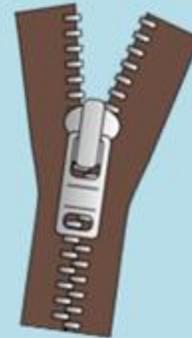
- Place evidence of innovation on the Innovation Tower such as photos, quotes, or drawings.
- Include some discussion questions and keywords generated from reading Rosie Revere on the tower.

### Follow-Up

- Gather children as a group to share their Innovation Space experiences, questions and wonderings with their peers.
- Invite children to generate new ideas and solutions to problems collaboratively.
- Ask children to find the word innovation in the school, classroom, or home.
- Suggest that children talk to their peers, siblings and parents about innovation.

**What is  
innovation?**

Innovation is **creating**  
or **improving**  
a **thing** or **action**  
to make a **difference.**



## Word Cards

**Inquire**

**Ask**

**Plan**

**Create**

**Test**

**Improve**

**Share**

**Celebrate**

**Impact**

**Difference**