

# EDUCATION FOR INNOVATION

Early Learning – Kindergarten

A Resource Guide



[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/Think  
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:

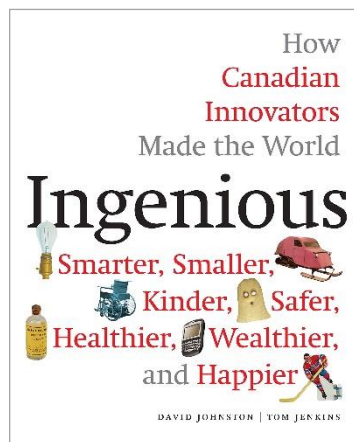
- Ask or respond to questions such as “what if ...?” or “what happens when ...?”
- Take risks to try something new or use materials or tools in a different way.

- 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.

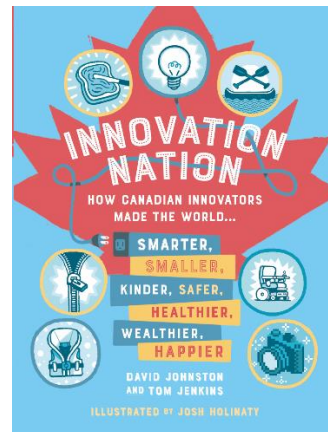
Therefore, innovation for young children is a natural process involving the engagement in a mindset of constant improvement and enhancement. Innovative thinking happens seamlessly in various experiences that are not specific to a particular area or topic in the Early Learning-Kindergarten program. Innovations 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.

## Background

Canada has a rich history of innovation which is described in the books co-authored by the Right Honourable David Johnston and Tom Jenkins:



*Ingenious: How Canadian Innovators made the World Smarter, Smaller, Kinder, Safer, Healthier, Wealthier, and Happier*



*Innovation Nation: How Canadian Innovators made the World Smarter, Smaller, Kinder, Safer, Healthier, Wealthier, and Happier*

The Canadian innovations from the *Ingenious* and *Innovation Nation* books form the basis for the *Education for Innovation (E4I)* resource. They are referenced in the teaching materials and provide the content and context for the study of impactful Canadian innovations. The writing team of the Education for Innovation resources was invited to develop educational materials to accompany the books, *Ingenious* and *Innovation Nation*. Educators may wish to also use a range of other supporting materials as can be found in the references of this document.

The book *Ingenious* includes approximately 300 Canadian innovations that made an impact on the world. It also includes suggestions and strategies for promoting innovation and encouraging future innovators; the charts from *Ingenious* are directly related to the processes and phases described in the Innovation Cycle.

*Innovation Nation* is for emergent readers, with descriptions of 50 Canadian innovations pulled from the content of *Ingenious*. The intent of these books is to highlight significant innovations throughout Canada's history and to further develop a culture of innovation in Canadian society.

The stories of Canadian innovators and innovations are an excellent catalyst for inspiring youth. Our national website, Canadian Innovation Space, includes stories of past and current innovators, videos, and supporting materials: <https://canadianinnovationspace.ca>. The website also includes testimonials by educators who have used the Education for Innovation resources in their learning environments. Administrators and educators planning to implement the Education for Innovation resources may wish to review the testimonials and related videos.

### **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 *Ingenious: 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**

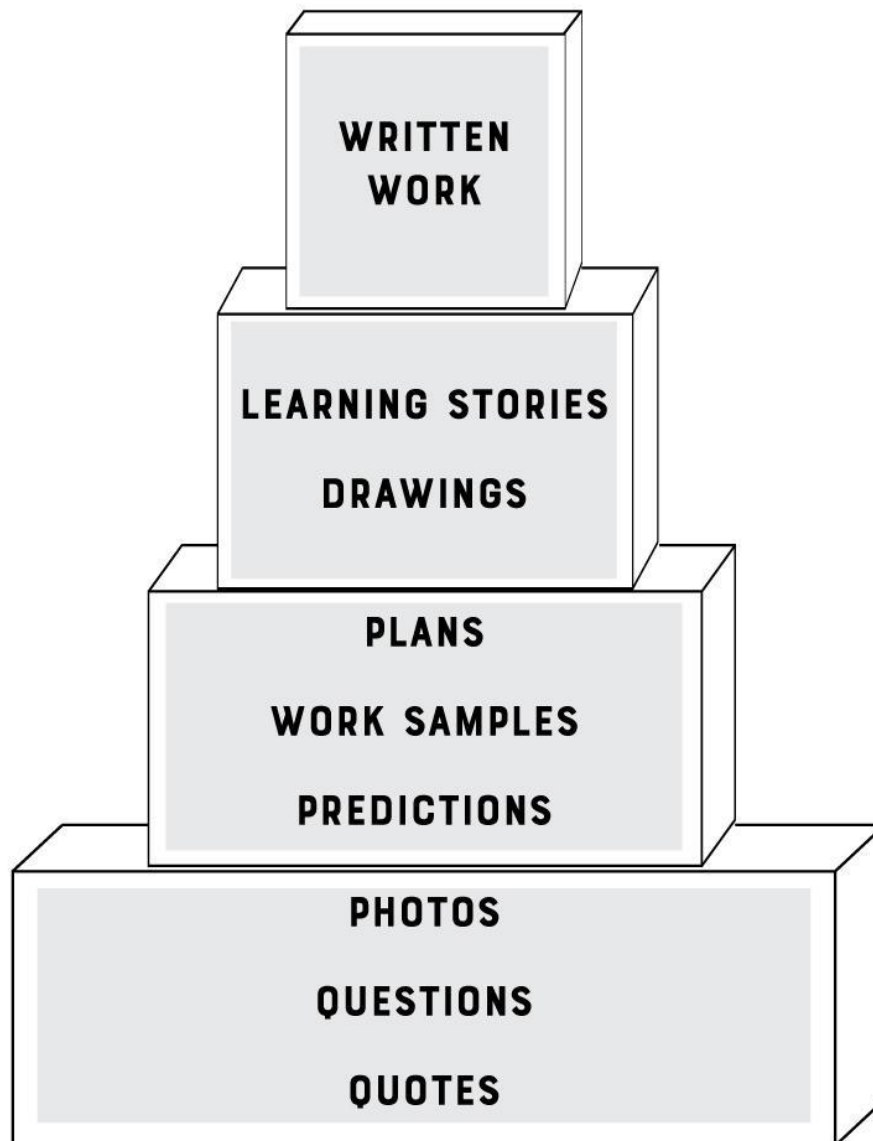
- Place the tower near the Innovation Space as a means of recording and showcasing innovative learning experiences. Placing it near the Innovation Space allows for association and easy transfer of learning.
- Introduce the tower to children at the same time as the Innovation Space.
- Collaborate with 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**

## Learning Experience 3: What Do Innovators Do?

### Background

Usually an innovation happens when someone notices a problem or issue and wants to fix it. Sometimes they have an idea on how to make something better. Innovators ask questions and investigate problems or issues. Innovators are inquisitive, persistent, resilient, creative and collaborative. Innovators ask questions, seek solutions, plan and design, test and improve, and most importantly take action to make a difference. In this learning experience, children are invited to learn about the qualities of innovators and to reflect on their own innovative skills and attitudes. The activities suggested offer a range of opportunities to discover the Innovation Cycle and the actions of innovators. Educators can select from the suggested activities to promote an understanding of innovative thinking and problem-solving. The pedagogical approaches are not necessarily sequential and can be used over an extended period of time.

### Materials

- *Innovation Nation* by David Johnston and Tom Jenkins
- *Not A Box* by Antoinette Portis: <https://goo.gl/C3WqWz>  
Description: This book outlines the INQUIRY that a box might be more than just a box. It could be a rocket ship or a canoe; it is all up to the individual's ability to use their imagination. The question or inquiry is 'What can a box be?'
- *IMAGINE* by Marija Katic and Dale Kern: <https://goo.gl/JwDRFo>  
Description: How big is your imagination? Travel along with Angel on her journey as she imagines what might happen if...
- *Rosie Revere, Engineer* by Andrea Beaty
- Video: How to Be an Inventor! | Kid President: <https://goo.gl/d14fcc>
- Interactive White Board
- What Do Innovators Do? ([Appendix 3A](#))
- *Innovation Nation* Graphic ([Appendix 3B](#))
- Innovation Cycle ([Appendix 3C](#))
- Questions Innovators Ask ([Appendix 3D](#))
- Interview of Innovator Qualities ([Appendix 3E](#))

### Pedagogical Approaches

- Review Rosie Revere's ideas throughout the book. *Prompts: How did her ideas come about? Did she notice a problem or was she trying to make something better? Remember that ideas can be big or small, and can be fun and imaginative.*
- Allow children to share ideas from their play activities (at school or home). *Prompts: What were you trying to make better? What was your idea? How did it work? Who helped you? How did you work together?*
- Show the video How to be an Inventor! | Kid President and remind children that there is a difference between an invention and an innovation. *Prompts: Can you identify the problem? How did Kid President look for a solution? How was the solution tested and shared?*
- Reflect on the video and point out the steps taken by Kid President such as: noting that the vacuum cleaner scared his cat, researching how vacuum cleaners are made, designing a new vacuum cleaner, testing it and sharing it with his cat!
- Ask children to describe the qualities of Kid President.



*Prompt: What did the Kid President do to solve the problem? (E.g. think, explore ideas, research, collaborate, find solutions, take risks, make connections, and communicate).*

- Read *Not A Box*, by Antoinette Portis.
- Use *Not a Box* to develop the idea of imagination, which will directly apply to the Innovation Space – children will be provided with all of these materials and no formal instruction; therefore, children need to use their imagination to create their own innovation or build from an already existing item.  
*Prompts: What happened in the story? What were some of the ideas for the box? Why is imagination important? How can you use your imagination in the classroom? Can you think of some good questions to explore?*
- Point out that there are several boxes in the learning environment (around Innovation Space).  
*Prompt: I wonder what innovations you will create with these boxes?*
- Read *IMAGINE* by Marija Katic and Dale Kern
- Explore the pages of the book, encourage prediction skills and have children expand on the ideas of the book.  
*Prompts: We used our imagination to create ideas today just like Angel in our book. What ideas did you have?*
- Encourage children in discussions to use the words such as INQUIRING, ASKING, PLANNING, MAKING, TESTING, and IMPROVING.
- Create a class chart that shows the Innovation Cycle. This chart will be displayed to aid ongoing learning and discussions on innovation. The Innovation Cycle (Appendix 3C) might be shown on an interactive white board for input and manipulation by the children.  
*Prompts: What do innovators do? Innovators start with an inquiry or question!*
- Point out the icons of the Innovation Cycle: **Question Mark for Think and Ask**, **Sky for Plan Ideas, Create and Make**, **Egg for Test and Improve**, and **GO for Share and Celebrate**

### **Innovation Space**

- Continue to allow children to create and explore in the Innovation Space.
- Add new materials to the centre as reflected by the interests of the children.
- Include boxes of various sizes to follow-up on the book *Not a Box*.

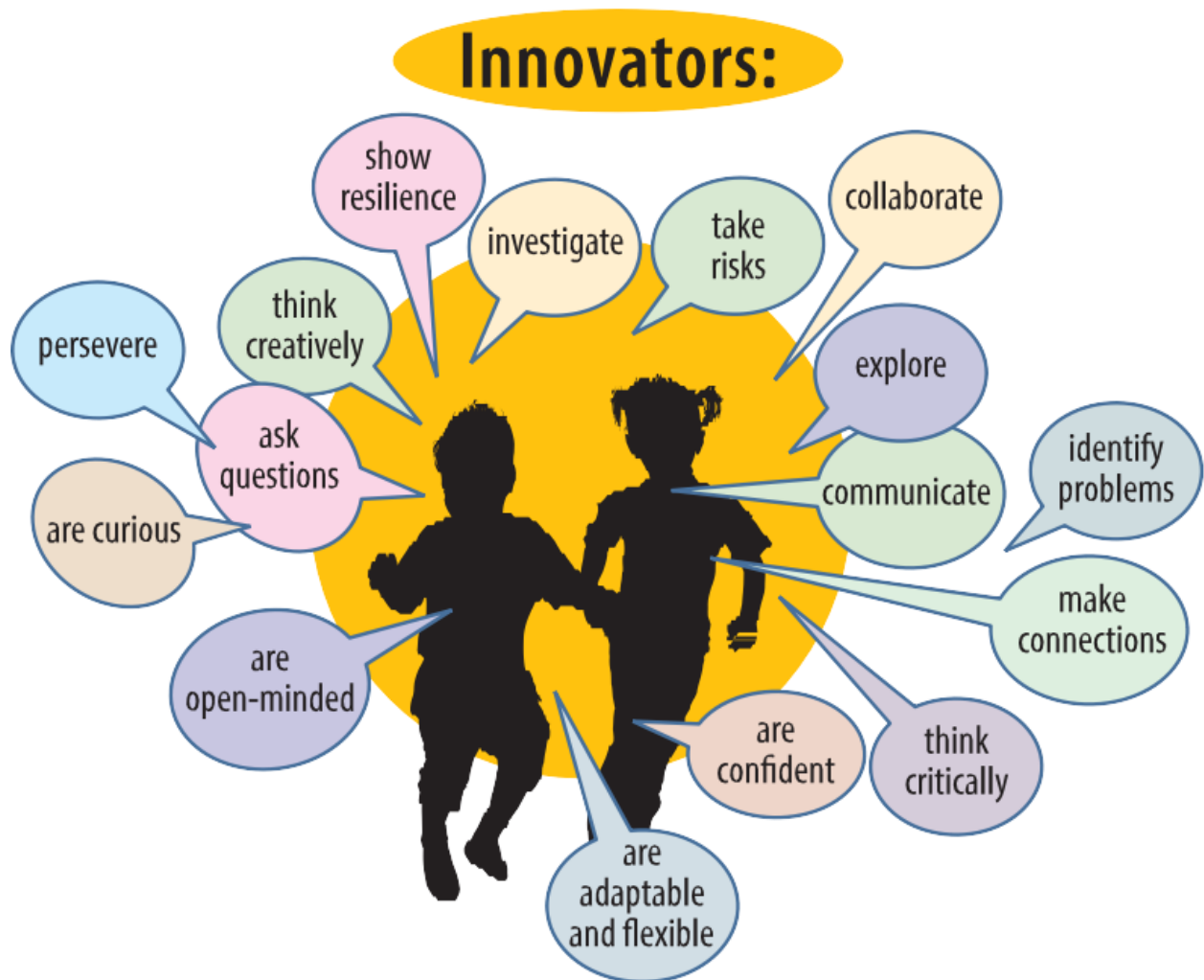
### **Innovation Tower**

- Indicate that the Innovation Tower is actually a series of boxes arranged into a tower.
- Encourage children to make the link between *Not a Box* and the tower exploring other usages of boxes.
- Display new innovations made by the children on the tower.

### **Follow-Up**

- Allow time on a daily basis for the children to share and reflect with each other about their experiences with the Innovation Space.
- Suggest that children interview their peers, learning buddies or parents. The Interview Questions may be read for the children as needed. The same questions can be used for a child's self-assessment (Appendix 3D or 3E).

## What Do Innovators Do?



*Excerpt from the Ontario Ministry of Education Kindergarten Program, 2016.*

# HOW YOU CAN

**Inquire**  
Investigate Issues and Solutions




- Investigate past innovations and present issues.
- What or who inspires you?
- What can you learn from past and present innovations?
- Imagine what your innovation looks like. What do you need to create it?
- Why is this innovation needed? What are the problems or issues that it addresses?



**Ideate**  
Develop an Idea




- Who can you work with to develop your idea—friends, family, classmates, parents, teachers, experts?
- How can you make connections with other ideas?
- How will you stay motivated when facing challenges?
- What impact do you want your innovation to have?

# BE AN INNOVATOR

**Incubate**  
Test and Revise Your Ideas










- What challenges are you facing?
- How will you test your innovation and make changes based on the feedback you receive?
- Are there different versions of the innovation that might work better?
- Is the innovation having the impact you wanted?

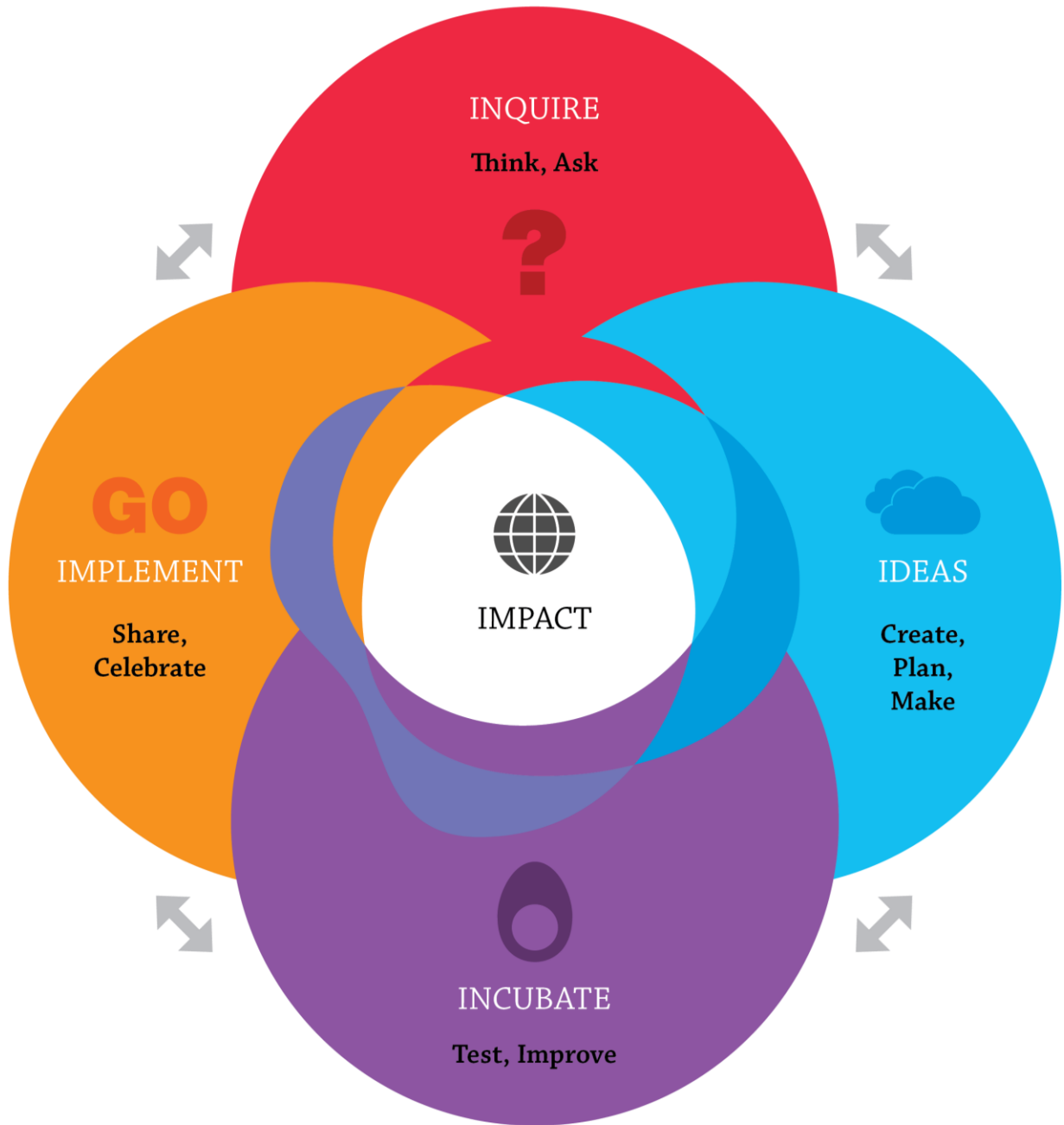


**Implement**  
Put Your Innovation into Action

- What is your plan for making and promoting your innovation?
  - design
  - marketing
  - materials
  - budget
  - schedule
- What roles do other team members have?
- How can you protect your innovation idea?
- Do you need any other resources?
- Should you register your innovation?
- How will you measure your success?

# Innovation Cycle



## Questions Innovators Ask

What difference do I want to make?

What did other innovators do?

Is there an innovation that I can improve?

What is my idea?

What is my plan?

What are my steps?

What do I need?

Why am I creating this?

Who can help me?

How will I test it?

How can I explain my thinking?

Can I try a different approach?

How can I make this better?

What do I want to improve?

Could I sell my innovation?

How will I share my innovation?

How will I celebrate my innovation?

Name of Innovator: \_\_\_\_\_

## Innovator Interview

Interview yourself, a peer, a parent, class visitor or community member.

Question	Yes	No
1. Do you like to ask questions?		
2. Do you investigate problems?		
3. Do you have a lot of ideas?		
4. Do you make plans for solutions?		
5. Do you test your solutions?		
6. Do you improve your ideas?		
7. Do you work with others?		
8. Do you share your innovations?		

## Learning Experience 4: What are Canadian Innovations?

### Background

This series of learning experiences is intended to increase awareness of innovations created by Canadians. The sample innovations that are introduced to children can be diverse or related to a collection of Canadian Innovations by topic or theme. The educator may wish to use the books *Innovation Nation* or *Ingenious* as a source of Canadian Innovations. Another source of stories of Canadian innovations is the site [CanadianInnovationSpace.ca](http://CanadianInnovationSpace.ca). The charts in Appendix 4A provide some ideas of innovations to introduce to Kindergarten children. These innovations could be presented in concrete or picture form. Educators are reminded to select innovations that reflect the interests and prior knowledge of the children. Some innovations that can be grouped are:

- Sports: hockey, lacrosse, basketball, goalie mask, snowshoe
- Arts: Cirque de Soleil, Group of Seven, IMAX, dinner theatre, movie theatre
- Food: maple syrup, Shreddies, chocolate bar, McIntosh apple, peanut butter
- Health/Safety: life jacket, foghorn, insulin, electric wheelchair, air ambulance
- Communications: telephone, pager, walkie-talkie, BlackBerry, electric radio
- Snow-related: snowshoes, snowmobile, toboggan
- Environment: garbage bag, recycle box
- Transportation: canoe, toboggan, snowmobile, dump truck

The learning experiences described below are focussed on the topic of Canadian transportation innovations.

### Materials

- We All go Traveling By, by Sheena Roberts: <https://goo.gl/WF5dbo>  
Description: This story takes readers aboard a school bus as they travel by different forms of transportation.
- Websites of Canadian Innovation Stories: [www.canadianinnovationspace.ca](http://www.canadianinnovationspace.ca)
- Chart paper or interactive white board
- Canadian Innovations Chart ([Appendix 4A](#))
- Canadian Transportation Information Cards ([Appendix 4B](#))
- Transportation Innovation Plan ([Appendix 4C](#))
- Survey of Innovations ([Appendix 4D](#))

### Pedagogical Approaches

- Indicate that there are many ways that people get from one place to another. The ways that we travel are called transportation.
- Have children brainstorm a list of transportation examples that they know (include, land, air and water).
- Read *We All Go Travelling by*, by Sheena Roberts). *Prompts: What forms of transportation did you see? What was different about each form of transportation? What was the same? Can you think of other ways to travel?*
- Guide some inquiry-based questions to allow children to start thinking. *Prompt: What are some ways in which we get to school, across a mountain, down a snow hill, across a lake/sky? What are some modes of transportation that we have listed so far? Where would someone need to use...*

...a canoe?  
...a toboggan?  
...a snowmobile?  
...a dump-truck?

- Introduce the following Canadian Innovations: canoe, toboggan, snowmobile, dump truck. Refer to Appendix 4A for description and origin of innovations.
- Display photos or models of each innovation.
- Have children share if and where they can see each of these modes of transportation. *Prompts: Why were they were created. What is their purpose? What do they do? How do they help people?*
- Invite children to discuss a Canadian innovation such as a canoe, toboggan, snowmobile and dump truck. Conduct an inquiry on the innovation by answering the six questions on Appendix 4B with a learning buddy, volunteer or parent.
- Encourage ideas to improve Canadian innovation examples such as the canoe, toboggan, snowmobile and dump truck. *Prompts: How can we make a toboggan move more quickly? How can a snowmobile be adapted for children? How can a canoe be safer?*
- Use a survey to determine the children's favourite Canadian transportation (Appendix 4D). This activity could be posted on a class website for parental participation.
- Discuss some new modes of transportation such as driverless cars and light rail transit.
- Have children create ideas for new and different modes of transportation that we do not have today. Brainstorm new forms of transportation. *Prompts: What would this mode of transportation look like? What would it do? Would it be on land, water or the air...or all 3?*
- Show a Planning Templates (Appendix 4C and 4E) on interactive white board or chart paper
- Guide the children in developing a class plan for a new transportation innovation (Appendix 4C).
- Provide the planning template on clipboards for children's exploration.

### Innovation Space

- Add photos or artifacts depicting a dump truck, snowmobile, canoe and toboggan.
- Ensure that the centre includes a variety of materials for making or improving a mode of transportation.
- Invite children to try to improve any of these samples or to create a new mode of transportation using their imagination.
- Review the Innovation Phase Chart: Ask/Inquire, Plan, Test, Share (See Appendix 3A).

### Innovation Tower

- Review new additions to the tower.
- Ask children to reflect on the phases of innovation represented on the tower.

### Follow-Up

- Invite children to share any ideas, plans, testing and thoughts on any transportation creations (new or improving). *Prompts: Did you draw a plan? What did you create? What does it do? Why did you create this? How does it work? Did you test it? Did you make any improvements? How will you share your innovation?*
- Invite a guest speaker to the class to explain their work on a transportation project. The guests could be from the community, a secondary school, municipal planning department, university or college.
- Organize a class trip to a transportation centre such as a subway system, train, light rail transit, university engineering department working on new car models, bus terminal, etc.



## Canadian Innovations

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### What Existed Before

Button



Peanuts



Dollar Bill



Peach Basket



Jacket



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### Canadian Innovation

Zipper



Peanut Butter



Loonie



Basketball



Life Jacket



## What Existed Before

## Canadian Innovation

Telephone



BlackBerry



Cardboard Box



Egg Carton



Truck



Dump Truck



Mask



Goalie Mask



Screen



Multi-Touch Screen



## Canadian Transportation Innovations

### Dump Truck

The dump truck was created by Robert Mawhinney in 1920 in the province of New Brunswick. He put together a truck with a box in the back. The dump box had a crank handle and a cable that lifted the front end of the box high enough to dump its load out the open back! Today we see dump trucks at construction sites helping to move and dump big loads of sand and other materials.



### Snowmobile

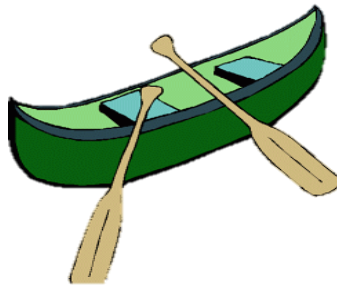
The snowmobile was created by Armand Bombardier in 1937 in the small Quebec town of Valcourt. He was just a regular repairman who fixed cars and sold gasoline. He wanted to build a vehicle that could travel quickly and reliably in even in the snowiest, iciest conditions.



## Canadian Transportation Innovations

### Canoe

The Indigenous people of Canada are the creators of the world-famous canoe! It is a perfect mode of transportation for lakes and rivers. It is light, fast and quiet, using a paddle(s) to guide it through the water. The first canoes were carved from tree trunks by hand. The first explorers of Canada used canoes to paddle their way through our country. Canoes are used all over the world today and are made of various materials and colours.



### Toboggan

The Inuit people of Canada's Far North created the toboggan to help them move their belongings from place to place in the snowy landscape (by person or dogsled). They were made of birch wood. Early Canadian settlers and hunters also used them to move things around. Today, we often use toboggans for fun to slide down hills! They have even been innovated further to be used for sport competitions at the Olympics (luge, bobsled and skeleton).



**Name:**

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## Inquiry of Canadian Innovations

**Name of Innovation:**

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**A picture of the innovation:**



What does it do?

Who uses it?

Where is it used?



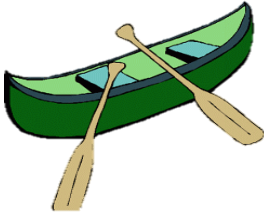

Why is it used?

When is it used?

How can it be improved?

## Survey of Canadian Transportation Innovations

Let's Vote on Our Favourite Innovation!

<b>Innovation</b>	<b>Tally</b>
<p data-bbox="277 445 511 489">Dump Truck</p> 	
<p data-bbox="280 739 508 779">Snowmobile</p> 	
<p data-bbox="337 1050 451 1089">Canoe</p> 	
<p data-bbox="302 1360 485 1404">Toboggan</p> 	

## Our Transportation Innovation

Name of Innovators:

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Name of our Innovation:

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Draw your idea for an innovation



## Learning Experience 5: How Do Innovators Plan?

### Background

In this learning experience, children will be encouraged to think about an innovation that will make an improvement and impact on the world. Educators may wish to engage small groups of children or the whole class in an Innovation Project. For example, some groups of children may have expressed an interest in developing a new game for outdoor play; making a new toy; creating a new routine for snack time; exploring a new form of communication; or building an improved means of transportation. After the inquiry (research phase), children can be supported in the planning phase with educator modelling and peer mentorship. Planning can be conducted individually, in small groups, with learning buddies or parents, or with the whole class. Planning is based on ideas generated to address an issue or problem identified by the children with possible innovative solutions.

### Materials

- Video: How to Be an Inventor! | Kid President: <https://goo.gl/8d5hPS>
- Innovation Plan template ([Appendix 5A](#))

### Pedagogical Approaches

- Introduce the planning phase by asking: What do innovators do with their ideas before they create an innovation? How do innovators make plans? What is another word for planning? Who makes designs? (e. g. urban planners, engineers, architects, etc.).
- Review Rosie Revere’s plans throughout the book. Discuss what she uses and what details she put in her plans. *Prompts: Do these plans look like her creations? Have you made any plans in the past?*
- Review the Kid President video and how he made plans for an innovation that did not scare his cat.
- Provide some concrete examples of planning on the interactive white board, such as blueprints or sketches, and discuss how they are two-dimensional portrayals of a plan.
- Model the planning phase. It is important for children to understand how each phase of innovation works in practice. To help this, educators are encouraged to model the phase while speaking aloud their thoughts and ideas. Discuss with the children what it means to plan out an idea. On a piece of chart paper or interactive white board, identify an issue or problem and then draw out an idea/solution that the educator wants to create in the Innovation Space. Mention the purpose and impact of the idea.
- Remind children of the transportation innovation planning that was completed earlier.
- Ask children to identify an issue or problem that is present in their classroom or home. For example, children cannot go outside to play when it is raining. Ask the children to generate possible solutions such as: a retractable tarp to cover the playground area, hats that have built-in umbrellas, class set of waterproof boots, etc. Another example is that clean-up of the classroom is problematic. Children may suggest a clean-up robot, an automatic sorting system, a new cleaning committee, etc.
- Model how to plan for an innovation by drawing a design for a possible solution such as hats with built-in umbrellas, a cleaning robot, etc. *Prompts: What is the problem? How will you solve it? What materials are needed? What are the steps involved in the plan?*
- Provide planning tools/templates for the children to explore ([Appendix 5A](#)).



### Innovation Space

- Review the Innovation Cycle in the centre and emphasize the words Ask/Inquire and Plan
- Provide planning templates and clipboards and/or electronic planning devices. *Prompts: You will notice that there are clipboards with paper and writing tools at the Innovation Space. I wonder what plans you will create today. You may wish to use the computer or tablet to make a design/plan.*

### Innovation Tower

- Discuss the new daily additions to the tower.
- Encourage children to ask each other various questions and to lead a group discussion.

### Follow-Up

- Allow time on a daily basis for children to share and reflect with each other about their experiences with the Innovation Space and contributions to the Innovation Tower. *Prompts: We planned out our ideas today before we created. What plans did you make? Tell us ... show us!*

## Innovation Plan

Innovators:

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Name of Innovation:

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Purpose:

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Materials:

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Draw a Plan for your Innovation



## Learning Experience 6: How Do Innovators Create?

### Background

In this learning experience, the planning phase of the Innovation Cycle includes the making or creating of an innovation. Children are encouraged to turn their plan into reality by building, creating or initiating an innovation. Children can use materials from either the Innovation Space or from home to make their innovations. Some innovations will be products that will be constructed as prototypes, but may not actually function, such as a classroom cleaning machine that picks up and sorts blocks. Using found materials, children may build the robot cleaning machine with labels for each part. Other innovations may represent a new way of doing things and thus do not require a physical construction, but instead may need other resources such as new roles and rules. Creating can be conducted individually, in small groups, with learning buddies or parents, or as a class. The innovation should be based on the ideas and plans generated by the children to make a positive impact. In this learning experience, the educator models the creation of an innovative paint roller that makes designs and children are invited to make their own version of the paint roller in the Innovation Space.

### Materials

- *Rosie Revere, Engineer* by Andrea Beaty
- Video: How to Be an Inventor! | Kid President: <https://goo.gl/mvcMt9>
- Materials from the Innovation Space
- Paint rollers, popsicle sticks, toilet paper rollers, foam stickers, foam sheets, natural items (leaves, twigs), sponges, paint, paper, elastic bands, glue, tape, string
- Innovation Plan Example ([Appendix 5A](#))

### Pedagogical Approaches

- Introduce the creating/making steps of the Plan Phase by asking: What do innovators do with their ideas after they make a plan? What is needed to create your innovation? Do you know any community helpers or jobs of people who make or create things (toy or car manufacturers, builders, construction workers)?
- Review Rosie Revere's creations that she made throughout the book. Discuss what she used and how she made things.
- Review the video and discuss how Kid President made an innovation that did not scare his cat. *Prompts: What did he use? How did he think of the idea? What did he combine to make the innovation?*
- Introduce the Canadian paint roller innovation and show how the Canadian innovator, Norman Breakey, combined the paint roller with a handle to make a new way to paint large surfaces. *Prompts: What are the two ideas that were combined to make this paint roller? How could we improve the paint roller? What if I want the paint roller to make designs? What can I attach to the paint roller to make designs?*
- Model the making or creation steps. It is important for children to understand that after planning, innovators make or create their innovations. To help this, educators are encouraged to model making/creating while speaking aloud their thoughts and ideas. Draw out a plan for a paint roller that makes designs. Draw a paint roller and list some shapes to glue on it.
- Create the innovative paint roller prototype that makes designs by attaching such items as sponges or shapes to the paint roller. *Prompts: How do I glue these items? What can we call our new fancy paint roller? Would you like to make a new innovative paint roller or new way to paint?*

- Invite children to make a plan for a new kind of paint roller that is made with various materials. Children can complete a planning template if desired (Appendix 5A).
- Provide other concrete examples of Canadian innovations on the interactive white board to illustrate the building process. Discuss such terms as prototype and working model.

### Innovation Space

- Ensure that the centre includes a range of materials, obtaining resources from homes and the community.
- Review the Innovation Cycle in the centre and emphasize the words Plan and Create/Make.
- Use parents, learning buddies or volunteers to assist with the creation phase.
- Provide alternatives such as whole class innovation creations.
- Encourage children to use the innovative paint roller.

### Innovation Tower

- Discuss the new daily additions to the tower.
- Encourage children to display their innovative creations on the tower at various stages of completion.

### Follow-Up

- Have children share their creations with the whole group.
- Allow time on a daily basis for children to share and talk with each other about their experiences in the Innovation Space and contributions to the Innovation Tower. *Prompts: Tell us about your creations? What materials did you use? How did your plans turn out? Did you have any challenges or problems?*
- Organize visits to a school or community centre that includes a Makerspace or 3D printers to create innovations.
- Invite a community member who builds, constructs, welds materials, sculptures or creates art forms to bring their materials and tools.

## Learning Experience 7: How Do Innovators Test and Improve?

### Background

An important phase of innovation includes the processes in the Test Phase, where innovations are tested and improved before full usage and implementation. During this phase, innovators experiment and collect data on the innovations to determine potential impact. Innovators test their creations to see how well they work and reflect on how they can improve their innovation to make it better. Children may notice signs in the community of Innovation Incubators, Start-Up or Accelerator Centres providing support for new innovations. The information collected in the testing phase may cause the innovator to revisit ideas and materials in making improvements. Some ways of testing innovations include asking people to use the innovation and then requesting feedback on the feasibility of the innovation.

### Materials

- Video: How to Be an Inventor | Kid President: <https://goo.gl/mvcMt9>
- Children's Innovations
- Paint roller innovation
- Art supplies (paint, foam, stickers, paper towel rolls, toilet paper rolls, popsicle sticks)
- Innovation Test Phase template ([Appendix 7A](#))
- Innovation Interview template ([Appendix 7B](#))

### Pedagogical Approaches

- Review Rosie Revere's innovations. *Prompts: What were Rosie's innovations? Why did she make them? What happened when she tested them? Did they work the first time? What did she do when they didn't work? What does this tell you about her?*
- Revisit Kid President saying failure is acceptable; explain that part of being an innovator is not giving up after a test has failed. Rosie and Kid President keep trying.
- Allow children to share their reflections on their innovations. *Prompts: How did they test them? Did they work? What did they do next?*
- Model the testing process with the art paint roller, or similar. *Prompts: Did it work well? Were there any problems? Were the designs clear? Did the shapes stick to the paint roller or fall off? Did the paint make the shapes too soggy?*
- Allow the class to make general observations about how well it worked and generate new ideas on how to improve it. Start an improved plan (in front of the children) with the modifications. Emphasize that it is okay for a test to fail because it is part of innovating. Children are to reflect on how they can improve/fix what they have created and try it again!
- Refer to the Innovation Cycle chart ([Appendix 3A](#)) and point out the word: Test. Review all phases of Innovation (Ask/Inquire, Plan, Test, Share). Point out that the cycle continues again until the innovation is just right!
- Refer to Impact at the centre of the cycle and discuss with children that innovators try to make a positive difference, yet, every innovation may have both positive and negative impacts.
- Encourage children to test their new innovations and record their observations on the templates provided ([Appendix 7A](#)). Children may be videotaped being interviewed.
- Provide opportunities for children to interview peers and adults for feedback on their innovations with simple questions ([Appendix 7B](#)). Adults or learning buddies can be asked to read and complete the Innovation Testing Form in discussion with children.

### Innovation Space

- Provide tools and templates to record the testing results (Appendix 7A, 7B).
- Provide materials for improvements to the innovations.
- Display innovations at various stages of completion.

*Prompts: What you will test today? Reflect on how well it works and what improvements you want to make. Don't forget to draw out a new plan if you need to! There are clipboards and chart paper at the centre.*

### Innovation Tower

- Place and review any new documentation to the tower.
- Note all the phases of innovation represented on the tower.

### Follow-Up

- Invite the children to test any creations.
- Have the class share their observations and reflections. Any new ideas on how the creation can be improved?

## Innovation Test Phase

Innovators: \_\_\_\_\_

Name of Innovation: \_\_\_\_\_

Question	Yes	No
Does it work?		
Can it be improved?		
Was it improved?		
Does it work now?		

Talk about how you tested and improved your innovation:

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## Innovation Interview

Name of Innovation:

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Name of Innovators:

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Name of Tester:

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Question	Yes	No
Do you like our innovation?		
Would you use our innovation?		
Is our innovation useful?		
Would you buy our innovation?		

Tell us what you like:

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Tell us what we should improve:

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## Learning Experience 8: How Do Innovators Share?

### Background

The next phase to explore is the Share Phase. In this phase, the innovation is communicated and shared with others. In the adult world, innovations are implemented through marketing, budgeting, sales and celebration. Young children can engage in some of the same elements of implementation by pretending to sell their innovations in a dramatic play centre store and by presenting their innovations in an Innovation Celebration. The innovations created by individual children, small groups or the whole class can be showcased with short commercials or simple advertisements and costs estimates. Children can take on different roles such as marketer, manager, salesperson, or artist. Social innovations such as a new snack routine or outdoor play area could be presented as a proposal to the school administrator or parents. The way the class decides to celebrate the learning experiences related to the sharing and celebrating phases of the Innovation Cycle can be adjusted as deemed appropriate to the context and learning environment. Celebrations can be virtual or in-person. Educators are encouraged to use electronic means such as a class website or social media to communicate and celebrate children's innovative activities and learning experiences.

### Materials

- Display Tables and/or class website or learning management system
- Innovation Space materials
- Display of Canadian innovations
- Display of books related to innovation
- Portfolios and Videos of Children's Innovations
- Innovation Tower
- Canadian innovation snacks (E.g. McIntosh apples, maple syrup, Shreddies)
- Invitation to Innovation Celebration template ([Appendix 8A](#))
- Innovator Certificate ([Appendix 8B](#))

### Pedagogical Approaches

- Organize an Innovation Celebration to showcase the children's innovative inquiries and projects. The Innovation Celebration could be in the learning environment or as part of a school-wide innovation event. The celebration can be videotaped and posted for parents who could not see the innovations in person.
- Display Canadian innovations around the Innovation Celebration and share how children learned about innovations made by Canadians (e.g. transportation).
- Adapt and sing a song with children such as "The Wheels on the Bus" to describe Canadian Transportation Innovations. The song could be "The paddles on the canoe go \_\_, the dirt in the dump truck goes \_\_, the motor on the snowmobile goes \_\_\_..."
- Serve Canadian innovation snacks such as McIntosh apples and maple syrup as deemed appropriate
- Encourage children to share their innovations and to make titles, labels and price tags for innovations.  
*Prompts: What would you like to call your innovation? How much would it cost? Who would buy it? How would you sell/share your innovation?*
- Allow interested children to present their innovations in small or large group settings. *Prompts: What will you tell people about your innovation? Why did you make it? How did you get the idea to*

*make the innovation? Who worked with you? How long did it take to make or create the innovation? Did you test it? How did it work?*

- Set-up stations for visitors: Asking/Inquiry Station, Planning and Making Station, Testing Station and Sharing Station with items for exploration at each.
- Provide certificates to children, which can be signed by visitors (Appendix 8B).

### **Innovation Space**

- Provide challenges and materials in the Innovation Space for visitors to engage in developing ideas for innovations.
- Showcase the children's innovations with labels, tags, and completed templates.
- Provide children opportunities to describe their innovations.
- Invite visitors to contribute comments, feedback and additional materials to the centre.

### **Innovation Tower**

- Display the artifacts and documentation that highlight the children's learning and understanding.
- Invite children to describe the phases of innovation as evidence of their learning.
- Invite visitors to contribute to the tower.

### **Follow-Up**

- Give children prompts to use dramatic play to share their innovations with visitors.
- Use mathematics skills such as counting, graphing and representing with innovations.



Dear Guest,

## You're invited to our Innovation Celebration!

Come view our exciting Innovations. We've been busy! Ask us about how we inquired, planned, created, tested and improved. Now we are ready to celebrate!

When:

Where:

Address:



Dear Guest,

## You're invited to our Innovation Celebration!

Come view our exciting Innovations. We've been busy! Ask us about how we inquired, planned, created, tested and improved. Now we are ready to celebrate!

When:

Where:

Address:



## Book List

### ***Beautiful Oops!*** by Barney Saltzberg

- It's OK to make a mistake. In fact, hooray for mistakes! A mistake is an adventure in creativity, a portal of discovery.
- *Prompts: Is it okay to make mistakes? Why? If we make a mistake should we just give up? Why? What are some ways we can learn from our mistakes?*

### ***Diggers and Dumpers*** by Tim Bugbird

- Join the Mini Mechanics as they learn and discover more about the amazing world of vehicles!
- *Prompts: Why is it important that we have trucks like this? Do you think we can make these trucks better somehow?*

### ***If I Build a Car*** by Chris Van Dusen

- Young Jack is giving an eye-opening tour of the car he'd like to build. There's a snack bar, a pool, and even a robot named Robert to act as chauffeur
- *Prompts: How would you build a car? What are the important parts to a car? What would add to make your car better?*

### ***Imagine*** by Marija Katic and Dale Kern

- Travel along with Angel on her journey as she imagines what might happen if...
- *Prompts: How will you use your imagination today? What ideas will you come up with? What could happen if? What else might happen?*

### ***Innovation Nation: How Canadian Innovators Made the World Smarter, Smaller, Kinder, Safer, Healthier, Wealthier and Happier*** by The Right Honourable David Johnston and Tom Jenkins

- This is a book with 50 Innovations that made a difference in the world.
- *Prompts: What difference did an innovation make in your life? Which is your favourite innovation? Why? Can you improve an innovation?*

### ***Ish*** by Peter H. Reynolds

- Drawing is what Ramon does. It's what makes him happy. But in one split second, all that changes. A single reckless remark by Ramon's older brother, Leon, turns Ramon's carefree sketches into joyless struggles.
- *Prompts: How would you feel if someone said something mean about something you were very proud of? How can we make sure that we do not use hurtful words? Does our work have to be perfect?*

**Not a Box** by Antoinette Portis

- A box is just a box . . . unless it's not a box. From mountain to rocket ship, a small rabbit shows that a box will go as far as the imagination allows.
- *Prompts: What are some different ways you would play with a box? What are some other objects we could use our imagination to play with?*

**Not a Stick** by Antoinette Portis

- With a stick in hand, the options are endless—whether it's conducting an orchestra, painting a masterpiece, or slaying a dragon.
- *Prompts: What are some different ways you would play with a stick? How could we use the stick and a box together using our imagination?*

**Pete the Cat: Go, Pete, Go!** by James Dean

- New York Times bestselling author-artist James Dean brings us a new Pete the Cat adventure, a special reimagining of “The Tortoise and the Hare” as a race between Pete and Turtle, in Pete the Cat: Go, Pete, Go!
- *Prompts: Which vehicle is fast? Why? What are some changes we can make to each vehicle to make them faster?*

**Rosie Revere, Engineer** by Andrea Beaty

- Rosie may seem quiet during the day, but at night she's a brilliant inventor of gizmos and gadgets who dreams of becoming a great engineer.
- *Prompts: How does Rosie use the innovation process to create her creations? Why is it important to innovate? What can you learn from Rosie's mistakes?*

**Sheep in a Jeep** by Nancy E. Shaw

- A flock of hapless sheep drive through the country in this rhyming picture book.
- *Prompts: Why couldn't the jeep move? What can we do to make this jeep work better? Could we use the parts of the jeep for other things?*

**Sky Colour** by Peter H. Reynolds

- Marisol loves to paint. So when her teacher asks her to help make a mural for the school library, she can't wait to begin! But how can Marisol make a sky without blue paint?
- *Prompts: Does our artwork have to be perfect with the colours, shapes and lines we use? Why? Do our inventions have to be perfect? Do they have to be based on inventions that have already been made? Why?*

**The Dot** by Peter H. Reynolds

- Vashti can't draw - she's no artist. To prove her point, Vashti jabs at a blank sheet of paper to make an unremarkable and angry mark.
- *Prompts: Why is it important to be creative and use your imagination? Is everyone's artwork the same? Why not? Is that good or bad?*

***The Most Magnificent Thing*** by Ashley Spires

- A little girl and her dog assistant set out to make the most magnificent thing. But after much hard work, the end result is not what the girl had in mind.
- *Prompts: If we get stuck working on our inventions, should we give up? What are some ways to help us get un-stuck?*

***We All Go Travelling By*** by Sheena Roberts

- This story takes readers aboard a school bus as they travel by different forms of transportation.
- *Prompts: What forms of transportation did you see? What is different about each form of transportation? What was the same? Can you think of other ways to travel?*

***What Do You Do with an Idea?*** by Kobi Yamada

- This is the story of one brilliant idea and the child who helps to bring it into the world. As the child's confidence grows, so does the idea itself.
- *Prompts: What would children do with an idea? If you are ever stuck while thinking about an idea, what could you do to solve it?*

## Use of Learning Centres for Innovations

### Learning Centres:

- **Writing Centre:** children can use this centre to plan or write about their innovations. Word cards could be placed at the writing centre that relate to innovation. The children can also write labels and instructions for their innovation. Educators may ask children about what they are writing and celebrate their attempts at communicating in written form.
- **Water Table:** children will use this centre to experiment, with an emphasis on testing their innovations (which they may have created at the Innovation Centre). Educators may ask children why their innovation might sink or float and what can be done to make it better.
- **Sand Table:** children will explore in this centre, especially with a Canadian innovation such as the dump truck. Educators may ask children about the dump truck, what it's used for and how they think it can be improved. Educators could also ask about different types of materials besides sand, such as asking if the dump truck would work in the snow, rain, hard ground, in the lake, over puddles, etc.
- **Drama Centre:** children will use the materials at this centre to help them act out the many different situations. The Drama Centre could be made into a store where the children display and 'sell' their innovations. Educators may ask the children what is happening during play and what their role is to share the innovation.
- **Block Centre:** children will use this centre to build structures and can use the blocks to learn more about different concepts such as foundations and balance. Educators may ask why children are building certain things and how they can be improved. If children are using this station to examine the modes of transportation they used, educators can ask about the speed of the vehicle in relation to a ramp that is in the block centre (*What makes it faster? What makes it slower? What could you do to make it go faster or slower?*).
- **Art Centre:** children will experiment with the many different materials available to them at this centre. Children are encouraged to use these materials to create or enhance innovations and to make blueprint-like designs. Educators may ask why a child has chosen to create their art and why they have chosen to make such modifications on their innovation.
- **Math Centre:** children will use this centre to develop a range of math skills through play and to estimate pretend costs for the innovation. Educators may ask children about their thought process and how they developed questions, problems and solutions.
- **Discovery/Sensory Bin/Centre:** This centre allows children to explore, observe, classify, seriate, infer and predict, leading to a greater understanding of innovations and will also allow them to develop fine motor and sensory skills. Educators may direct their questions by asking what children have discovered within the sensory bin. Inquire about how children are interacting and playing with the materials. Ask if children have any wonders about the items that are in the bin.
- **Music/Listening Centre:** This centre provides children with the opportunity to create and to listen to music using different instruments and materials. Educators may ask children to reflect on how a musical instrument or song was made or could be improved. If children have created an



instrument, an educator may ask: *How does it work? How did they make it? Could it be improved in any way?*

- **Woodworking Centre:** The woodworking centre usually consists of a workbench, appropriate tools and related materials. This area is important to develop technological concepts and skills and is quite appropriate for young children with proper supervision. Suggestions for Educators: inquire about how children are using the materials at this centre. Educators should ask children what they are doing, what they are using, and what they have learned through playing.
- **Play-dough Centre:** The play-dough centre provides children with the shapes and their imagination, which they can use to make different models. Educators may ask children what they are modeling with the play-dough, why they are making it, and how it relates to what they have been learning in class.

### Outdoor Play

- Educators may use the outdoors as an extension of the learning environment to encourage children to experiment with their innovations and ideas in different weather conditions and in various contexts. Children may reflect on their ideas and innovations examining how they would work in such weather as snow, rain puddles, or on various terrains such as rough ground, soft ground, or down a hill.
- The outdoors may also be a catalyst for innovative thinking as children problem-solve how to address a range of weather conditions. Educators may stimulate discussions of how Indigenous and Inuit peoples were innovative in creating life jackets, canoes, snow shoes, igloos, longhouses and lacrosse to interact positively with nature.
- Children may wish to bring natural materials from the outdoors into the classroom to create innovations. Transfer of ideas and innovations between the indoor and outdoor learning environments is an innate process for young children and is to be fostered and supported by educators.

### Family/Community Engagement

- The relationship between home, community and school serve as an important way for children to recognize and appreciate the range of innovations in their world. Conversations with families about innovations in the home can be supported by communications from the school. Educators may wish to promote surveys, interviews, books, videos and newsletters focussed on Canadian innovations that children can share with their families.
- When children engage in creating innovations, educators can provide opportunities for children to explain the innovations with their family in the school or home environment. The sharing of innovations can be electronic through a class website or learning management system, or in-person with class visits. Discussions about child-created innovations allow families to have a common language for communicating with their children.
- Innovation Celebrations provide opportunities for children to explain their ideas to varying audiences, expressing their learning through words, artifacts, and pictures.
- The community offers many venues where innovation is evident such as museums, science centres, art galleries, theatres, stores, and manufacturing buildings. Class trips, either in person or virtually,

are excellent ways to explain and nurture innovative thinking and problem-solving skills and attitudes in young children.

- Visitors to the class can also be asked to bring and describe Canadian innovations that are particular to their sector, employment or community service.

## Technology

- Educators can extend a child's learning and application of knowledge through technology by allowing them to use various devices such as smart phones, laptops, interactive white boards, and tablets.
- Models of older versions of technology can be examined for exploration and inquiry.
- Both children and family members can interact with educators who establish either a class website, Google site or a learning management system focussing on Innovation. There are many informative websites for research on innovations and various apps that allow for the creation and sharing of innovations.
- Innovation in education is not restricted to the area of technology. Instead, technology is a tool and strategy for the development of innovations and can be utilized at every phase of the innovation cycle while children are inquiring, investigating, planning, creating, testing, improving, sharing and celebrating innovations.
- Learning about Canadian innovations related to technology such as the smart phone, touch screen, IMAX, digital photography, search engine and light bulb are especially inspiring and motivating for children's exploration.

## Assessment

- In the Early Learning/Kindergarten environment, assessment *for* learning, assessment *as* learning and assessment *of* learning are possible through the use of observations and pedagogical documentations, which make children's thinking and learning visible to the child, the other children, and the family.
- Experiences related to innovation and problem-solving, as described in this resource, provide authentic opportunities for educators to observe, listen and respect children's innate interest in asking questions, planning, creating, testing, improving and sharing processes and products.
- The Innovation Tower is an appropriate way to collect, store and discuss artifacts which depict children's learning on a continual basis. Conversations with and among children about these artifacts are pivotal to understand and extend their thinking processes.

The Expectations Tracking Chart (Appendix III) provides educators with a tool to record educator observations and reflections, as well as the learning experiences as the children progress over a period of time.

## Curriculum Tracking Grid

**Innovation Experiences encourage children to:**

Communicate with others in various ways and for range of purposes.	
Demonstrate an ability to use problem-solving skills in a variety of settings.	
Demonstrate an awareness of own health and well-being.	
Demonstrate literacy behaviours to make sense of a variety of texts.	
Demonstrate literacy behaviours to communicate with others.	
Use the processes and skills of inquiry (i.e., questioning, planning, predicting, observing, and communicating).	
Demonstrate an awareness of the natural and built environment through hands-on investigations, observations, questions, and representations of their findings.	
Apply mathematical processes to support the development of mathematical thinking, to demonstrate understanding, and to communicate thinking and learning.	
Communicate thoughts and feelings, theories and ideas, through various art forms.	
Use problem-solving strategies, on their own and with others, when experimenting with the skills, materials, processes, and techniques used in exploring, creating, testing and sharing innovations.	
Use technological problem-solving skills, on their own and with others, in the process of creating and designing (i.e., questioning, planning, constructing, analyzing, redesigning, and communicating)	



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