Chapter 4: It's Easy Being Green!

Inquiry 2: Understanding Green Energies

- ***Provocation*** *– Poster, New Vocabulary*
- ***Question Generation*** *– Video, Pictures, New Vocabulary*
  Knowledge Building *– Knowledge Building Circle*
- ***Determining Understanding*** *- Plus Minus Interesting*
- ***Pursuing Learning*** *– Videos, Invention/Design Process, Onomatopoeia*
- ***Consolidation*** *– Inventors Museum*
- **Assessment** *– Green your school*
- ***Take Action***

A. Provocation

To hook student interest, introduce the provocation to initiate student's thinking about alternative energy.

Poster

Posters can be a great way of gaining student attention and interest. This link identifies the advantages to poster use in education and suggests 6 attributes of an effective poster. Suggestion: Put the image up on the whiteboard and have the students circle things that they notice.

Engage Your Students - Project Learning Tree

Possible Questions:

- What do you notice about the school?
- Is this school different from our school?
- Why is the name of the school "Green School"?
- Why is the sun, wind, water and earth used to create an alternative energy?

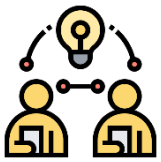
**Begin to introduce new vocabulary. (renewable/non-renewable, biomass (plants, wood, waste), solar power, wind energy, wave energy, geothermal energy, hydro power)

B. Question Generation

At this point in the inquiry, we want to harness students' curiosity and build off of the provocation that has captured their interest by generating meaningful questions to continue to drive the learning process.

Video
Play the video 100% Renewable Energy and write any new vocabulary on the board with the accompanying Alternative Energy Pictures.

What questions do your students have about the different types of renewable energies? Write them down.



C. Knowledge Building

At this stage, students may be ready to engage in a group knowledge building activity. It will encourage students to open their minds to many alternative ways of thinking about the provocation and ideas that have been generated thus far in the inquiry process.

Engage in a class Knowledge Building Circles-kindergarten (outside if possible)

Use one of the questions that you generated after the video to do a Knowledge Building Circle.

Possible **Umbrella Question**:

- What alternative energy do you think is the best one to use? Why?

D. Determining Understanding

At this stage of the inquiry, use responses to inform and guide the learning process. They can provide insight into which concepts need clarity, what students are already well informed about, and a general direction that students want to pursue.

At this point in the inquiry you may decide to use a tool such as **PMI strategy** .

How Can Plus Minus Interesting Strategy be Used in The Classroom?

School Walk

Have students take a walk through and around their own school and share what they believe is a plus, minus or something interesting around energy use.

PLUS	MINUS	INTERESTING
List all of the positive ideas that you noticed about energy in and around your school.	List all of the negative ideas or problems that you noticed about energy in and around your school.	List all of the interesting ideas, neither positive or negative, that came from your walk through and around the school.

Draw, write or record your thoughts on an iPad or journal.

E. Pursuing Learning

At this stage, students may begin research to pursue a question that has been generated, or the following activity could be integrated into the process to ensure that students have an understanding of foundational climate science. The activities listed below will enrich the understanding of alternative energies and climate change.

Help students understand the importance of inventions and share examples of students who have already created inventions to help climate change.

Video
This video is for junior students, it is suggested that you stop it often to help the younger students identify the problems and solutions.

Invention
Inventors see a problem and try to come up with a solution. Inventions can also make the world a better place. Use the video Engineering Design Kindergarten Science (Ask, Learn More, Create, Improve) to encourage students to design and construct something that will help with energy and climate change. Have older students label their Invention/Design Idea.

After they have illustrated their design, they can create a prototype (simple model based on a design). This prototype can be made from any material they choose (e.g., playdough, clay, pipe cleaners, recycled materials).

These challenges are taken from or adapted from Little Inventors.

- Choose three to five that you like and give the students a choice.
- Invent a machine to reduce the amount of electricity we use.
- Invent a new way to travel that uses less energy.
- Invent a way to create energy through exercising.

- Invent clothing with an extra ability to save energy.
- Invent a new way to water a garden that saves energy.
- Invent a Superhero outfit that creates renewable energy.
- Invent a hat or shoes that have an ability to create energy.
- Invent a machine that stops plastic from going into the ocean.
- invent an eco-friendly city/home.
- Invent a robot that can help us waste less energy.
- Invent a bicycle that does more than just get us to a different destination.
- Come up with your own idea for an invention.

Drama
When you present your design to the class, use Onomatopoeia.
The Onomatopoeia Alphabet | Onomatopoeia for Kids | Jack Hartmann .
Come up with at least 5 sounds that your invention makes.

Possible Extensions:
- Seed Launching Backpack, a 3D-printed, pollinator-friendly invention | The Kid Should See This (video example)
    - What problem did he notice? What was his solution?
    - What are the pros and cons of this invention?
- 11 Kid Inventors Break Down Their Greatest Inventions | The New Yorker

F. Consolidation

This step is designed to encourage students to integrate and synthesize key ideas. When students make connections and see relationships within and across lessons, it helps them to solidify knowledge and deepen their understanding.

Create an Inventors Museum

Invite another classroom to come to your Inventors Museum.

- Option 1: Each group will have to explain their invention and how it works to the different groups of students.
- Option 2: Each group will try to sell it to another class. They will need to explain why it is important for climate change and why they should buy it.

Schools — Canadian Multicultural Inventors Museum

Assessment Idea

Teachers will assess learning at different points throughout the inquiry using multiple methods. The following assessment provides an alternative evaluation method to standard quizzes and tests, that can be used after consolidation or at any point in the lesson to check for understanding.

Create Your Own "Green School"
Provide a picture of your school to each pair of students or small group in your class. Each group can add changes to the school that they believe will make the school "greener" and help with climate change. Have them present their thinking to the principal /superintendent /custodians or any other stakeholders.

Take Action

Allowing time for students to take action is an essential part of the learning process on climate change, as it empowers students and eases their eco anxiety.

These ideas for action can be utilized at any point in the learning process, whether it's now or after completing more guided inquiries. Please note that the suggestions are consistent in each chapter. Remind students that even when things get hard and seem so big they can always do something by taking action. Their actions will create an impact.

You might introduce the idea of students taking action by sharing the following YouTube "Climate Change Song":

If they need some ideas of simple and immediate measures they can implement you can share this document from Direct Energy. While it is written for parents, students can get the idea of something that would be attainable for themselves - or to share with their families! Ideas to Think Green

Ask the students what they want to do to positively impact climate change. List their ideas and come up with a plan to put their action in place.

Ideas for Taking Action:

- Model green behaviour - use a reusable water bottle, actively recycle, compost, bring your bags to the grocer, bring your mug to the coffee shop, repair things that need mending, buy second-hand when applicable, pack a litterless lunch, use cloth napkins, use toxic-free cleaners (or make your own), walk or bike instead of driving when possible - these are just some basic ideas. Check out Ideas to Think Green for more suggestions.
- Collect rainwater for the garden
- Compost your kitchen waste
- Try more plant-based foods
- Enrol in the EcoSchools program The core of the EcoSchools program is the EcoSchools Certification Application (ECA), our bilingual, online application platform that enables schools across the country to create and implement a customized environmental action plan that meets the needs of their community. At the end of each year, school plans are submitted and assessed by EcoSchools staff, and schools are awarded a certification level ranging from Bronze to Platinum.

- Do some of the Eco-Activities | Earth Rangers: Where kids go to save animals! to reduce our impact on the environment
- Develop a plan to conserve energy at home and/or at school and communicate this to this to the rest of the student body
- Enter one of the Little Inventors Climate Champions invention challenges offered by the Child Rights International Network. At Little Inventors Events you can find current, past and upcoming events such as Climate Champion Inventions and Protect Our Oceans Mission. It's worth exploring prior contests so students can see what other students across the globe have designed.
- The Little Inventors site (https://www.littleinventors.org/) also provides a variety of mini challenges under the heading "Challenges" with many related to the environment and climate change. Students can upload their creation to the site and hope it gets published and/or complete to share with the class or upload to a class' shared Google document. Here are some relevant mini challenges:
  Challenge to Protect Nature
  Invention to Protect Trees & Wildlife
  Make Sustainable Energy Through Exercise
  Invention to Waste Less Food

Action Project Examples

"CLOTHING SWAP AND CLOTHING INDUSTRY POLLUTION"- Port Elgin Regional School- NB (2021) K-1

- This class did an action project of a clothing swap to try to help reduce, reuse and recycle. They also did some research to see what materials are best for the earth. They want to encourage others to do clothing swaps and try to reduce the amount of clothing everyone uses. See their project here.

*How could you use these great examples to come up with action projects with your K-2 students?

Project 2050: *Climate-friendly habits to change the world!*

- Welcome to **Project 2050: *Climate-friendly habits to change the world!*** This national movement, powered by Earth Rangers in partnership with EcoSchools Canada, is about connecting youth with the knowledge and skills needed to tackle climate change.
- The program will provide an easy and fun way for youth and their families to contribute to the fight against climate change by adopting small but impactful climate-friendly habits.

Eco-Activity: Make a difference with just ONE tree! | Earth Rangers: Where kids go to save animals!

Eco-Activity: Eliminate energy-wasters in your home | Earth Rangers: Where kids go to save animals

Bullfrog Power Community Projects

- Activists and organizers across the country are working to transition their communities away from fossil fuels. We created our community-based green energy project grants to provide critical funding for these local efforts.
- All bullfrog powered customers help fund these small-scale, community-led projects, including solar panels on schools and in Indigenous communities, education and training programs, and a cleantech accelerator.
- Some examples of education-related initiatives, including Canadian Rockies Public School solar project can be found at the link above.