Incorporating Literacy and STSE to Engage Digital Learners in the Grade 9 Applied Science Class: Power Generation Pitch Project

«««« By Brandon Zoras

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Curriculum Connection: SNC1D and SNC1P (all science courses for Wikis in general).

Expectations

E.1.assess the major social, economic, and environmental costs and benefits of using electrical energy, distinguishing between renewable and non-renewable sources, and propose a plan of action to reduce energy costs;

E.1.2 assess social, economic, and environmental costs and benefits of using a renewable and a non-renewable source of electrical energy (e.g., solar, wind, hydro, nuclear, coal, oil, natural gas), taking the issue of sustainability into account.

Introduction

Wikis are a great tool that can be used with many curriculum expectations, but especially well with the STSE component. At the start of the electricity unit, the idea of the project is introduced about an island forming in Lake Ontario that needs its very own power generation station. Students are told to make a pitch to the mayor that convinces them that their type of power generation (coal, wind, nuclear, etc.) is the best for the island. Students may include images, videos, diagrams and any other form of media to help with the pitch. Students are to discuss the pros and cons and whether they believed renewable or non-renewable sources would best serve the environment and needs of the community.

Why Wikis?

This project gives an alternative to the standard poster/brochure project. Students use computers to create a wiki (details may be found at: www.wikispaces.com). Wikis allow a fluid document for individual use or group collaboration that can be worked on over a unit or even a whole course. Individual marks can be assigned, as Wikispaces can track each user and their contributions to the project. Wikispaces seamlessly allow integration of many other sites and applications. The possibilities are endless in its applications and students learn a skill they can apply across many

subject areas. Using technology in the classroom creates a more engaging project and gives students a chance to express creativity. These projects will have an STSE focus, incorporating science from the curriculum — using technology and the Wiki to share the information, talk about societal impacts and how the environment must be considered. Cross-curricular opportunities are possible between departments or even between schools.

Literacy

This project helps students' literacy skills in many ways. Students critically examine information in the textbook, websites, videos, and other media. In my class, I also had students looking at commercials by Cenovus Energy to promote extraction of oil in Alberta. This helped them to understand the importance and use of biases in the media as well. Students then shift to the creator role and give opinions and communicate a clear message through text and media. Science literacy is a huge factor as well, as students will learn about different power sources in Ontario. They also learn about sustainability, conservation of energy and making less of an ecological footprint on the Earth.

Engaging Applied Students

I have done this project for the past four years with small changes here and there from essential, applied to academic science classes. The applied students really enjoy this project as it allows them to express their creativity using technology. The majority of students are familiar with Wikis, uploading content, YouTube, looking for images and other media online. Getting them to use those skills with a local problem or topic in their community keeps them engaged. It is very easy to share student work as many of them show their parents the site and teachers can share the students' work as well.

Technology

Each school and class has a different availability of technology from class sets of netbooks, booking the school computer lab or using the school library to research. Students are digital learners surrounded by many types of technology. Being able to switch from consumer to creator has become very easy with advancements and programs such as wikis.

For the lesson plan, samples of student work, how to set up a Wiki and other resources please see: **mrzoras.wikispaces.com**.

Teacher Lesson Plan

Unit and/or Day: SNC1P — Comparing Renewable and Non-renewable Sources Through Wikis

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Materials

- Digital Projector
- Netbooks (class set)
- Ontario Power Generation Electricity Kit
- YouTube Videos (see below)
- Science Links 9 (textbook)

Time: 10 mins

Before... Minds On

Q: Canada has the 3rd largest amount of oil available. Should we take it from the ground to use and sell around the world?

Cut out oil drops and write answers. Students add them to the map of Canada on Yes or No side. Have them watch the following two trailers and ask if they want to switch answers after pairing with an elbow partner:

H2Oil Documentary Trailer http://www.youtube.com/watch?v=xenYLY5lU58
Cenovus — http://www.youtube.com/watch?v=D1mZMOP-wbY

Assessment Opportunities

DIAGNOSTIC: For Learning — See students' opinions on power generation in Canada and how much they already know.
FORMATIVE: As Learning — Question students on their choices and provide feedback.
FORMATIVE: As Learning — Walk around and discuss the wiki.
SUMMATIVE: Of Learning — Hand out rubric for wiki.
FORMATIVE: As Learning — Exit Card allows students to summarize what was learned in class, what concepts need further clarification, and what strategy will be used; teacher receives feedback from students which can be used to plan and develop future lessons.

Time: 60 mins

During... Action!

Students will use class set of netbooks to work on their wiki, (**wikispaces.com**) to propose the best type of power to use if a new island needed its own power supply in the middle of lake Ontario.
http://snc1pcedarbrae.wikispaces.com/

Students will access Ontario Power Generation site for different power types:
http://www.opg.com/education/program.asp

A) Students will be presented the problem of powering the island and given the rubric and expectations of the project (to make a proposal to the Mayor of which type of power is best for the island).
B) Students will be guided through the Wikispaces wiki and shown an exemplar of what is expected
C) Students will be given time to look through the Ontario Power Generation site, textbooks and the Internet for information on their topic
D) Students will work on the wiki using netbooks.

Differentiated Instruction

Content: Students will use critical thinking and choice to pick power source.
Process: Students will be given verbal instructions and a visual demo on how to use the wiki. They will also be given an exemplar.
Product: Students will be using wikis and have freedom to include visuals, text, audio and video to illustrate content and choice of power source.
Learning Environment: Students will collaborate with partners at the beginning and work individually on the wiki with peer support from neighbour.

Time: 5 mins

After... Consolidation & Connection

3-2-1 Exit Card — Power Generation
Students summarize what they learned in class, what needs further clarification, and what strategy will be used to remember the concepts.

Next Steps

Day 2: Continue research and complete the wiki.

Student activity and exit cards follow on next pages.

Student Activity

Name: _____ SNC1P

Electricity Generation Project

A new island is being built in the middle of Lake Ontario. The mayor of the island is requesting information on how to power this island. She has realized power lines will not work and that the island will require its own source of power generation. The possible types of power generation are listed in the table below.

Renewable Power	Non-renewable Power
Hydro Solar Wind Tidal	Oil Natural Gas/Coal Nuclear

You are to make a wiki site to present ONE of the power sources above to the Mayor.
Included in the wiki must be the following clearly labeled sections:

1. Title
2. Description of how the electricity is generated (include diagram)
3. Benefits of that form of power generation
4. Negative aspects of that form of power generation
5. Compare the efficiency to other forms of power generation
6. Video/Media/Pictures
7. Bibliography with at least 3 different resources used.

Component	Mark
Title	1 2
Neatness (clearly labeled sections)	1 2 3 4 5
Description of power source	1 2 3 4 5
Positive	1 2 3 4 5
Negative	1 2 3 4 5
Media	1 2 3 4 5
Diagram (how electricity is generated)	1 2 3 4 5
Bibliography	1 2 3
Research notes	1 2 3 4 5
Total	/40

Student Activity

Name: _____ SNC1P

Electricity Generation Project — Research Notes

Title	
Description of power source	
Positive	
Negative	
Diagrams	
Other notes	
Bibliography	

Attach any extra information.

3-2-1 Exit Card — Power Generation

Name: _____

Topic: _____

Three things I learned...

-
-
-

Two questions I still have...

-
-

One strategy I will use to remember...

-

3-2-1 Exit Card — Power Generation

Name: _____

Topic: _____

Three things I learned...

-
-
-

Two questions I still have...

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3-2-1 Exit Card — Power Generation

Name: _____

Topic: _____

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-