Using Inquiry in Social Studies Lessons to Target Environmental Education and Stewardship

Geographic Inquiry Model

Formulate Questions	Gather and Organize	Interpret and Analyse	Evaluate and Draw Conclusions	Communicate

Introduction: Geographical Significance Surrounding the Stories of Stuff

Students explore and analyze the elaborate process of product development through sourcing, extraction, production, consumption and disposal from a geographical perspective. Knowledge building emerges as students investigate the origins of various articles of clothing through the development and final processes as documented in the online film, *The Story of Stuff*, directed by Louis Fox and created by Annie Leonard. Engaging collaboration results in student generated "stories" of products as well as analysis of geographical strengths and weaknesses within these "stories".

Considerations for Planning

Prior to this lesson, students will need:

- experience working in groups;

- experience building consensus;
- experience finding the main idea and supporting details in media texts; and,
- experience using an atlas.

Resources and Materials
atlas, use of available technologies, i.e., computers, internet, projector/screen, large world map, post-it notes, word wall, reflective journal, chart paper, markers
BLM 1.1 – The Story of Stuff
BLM 1.2 – Exit Card

How does this lesson link to Environmental Education?
Standards for Environmental Education in the Curriculum (2008); suggests that students should be given the opportunity "to become environmentally literate; apply their acquired knowledge, perspectives, skills and practices in real-life situations; and, become environmentally responsible citizens who are aware of the global implications of local action". In this lesson, students begin to analyze the processes of extraction, production, consumption and disposal of consumer products from a geographical perspective.

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Lesson: Geographical Significance Surrounding the Stories of Stuff

This lesson is a field study of a local waterway that utilizes digital technologies to provide students with an opportunity to investigate the natural resources within their own community. Following field work, student observations and data will be analyzed within a collaborative, knowledge building framework.

Learning Goals:

By the end of this lesson students will understand and be able to:
- follow an inquiry-based approach (gather, organize, interpret and analyse data);
- examine the impact of human activities on waterways;
- consider multiple perspectives regarding an issue or problem; and,
- identify a few examples of sustainable practices.

Curriculum Expectations and Concepts of Geographic Thinking

Grades 7: Natural Resources Around the World: Use and Sustainability

Overall expectation:
• Demonstrate an understanding of the sources and use of different types of natural resources and some of the effects of the extraction/harvesting and use of these resources. FOCUS ON: Spatial Significance; Geographic Perspective
Specific expectations:
• Gather and organize information and data from various sources to investigate issues and challenges associated with balancing human needs/wants and activities with environmental stewardship in one or more of the political and/or physical regions of Canada.
• Interpret and analyse information and data related to their investigations, using a variety of tools.
Big Ideas: Human activity and the physical environment have an impact on one another.
Human activities should balance environmental stewardship while managing human needs and wants.
Framing Questions to Guide the Lesson: What impact can human activities have on the physical environment? Why is it important to consider the long-term impact of human activities?
How do we find the balance between environmental stewardship and human needs and wants?

Integrated Expectations across Subject Areas

Language: Oral Communication
• Use speaking skills and strategies appropriately to communicate with different audiences for a variety of purposes.
Language: Writing
• Generate, gather and organize ideas and information to write for an intended purpose and audience.
Science
• Analyse the effects of human activities on habitats and communities.

Relevant Terminology

interrelationships, natural environment, industry, habitat, stewardship, physical environment, sustainable

Minds On: Connecting Background Knowledge

Establishing Definition for Sustainable Environment
Large and small group activities (approximately 20 minutes)
- Organize students into small groups.
- Provide the following definition to each group:
  - A sustainable environment means an environment that can be maintained at a steady level without exhausting natural resources or causing severe ecological damage.
(Source: http://www.thefreedictionary.com/sustainable)
- Suggest: Within your groups, reword the meaning of the term, sustainable environment, to emphasize and develop a greater understanding of the consequences which human activities may have on the physical environment. Information sources may be utilized as needed (dictionary, thesaurus, computer), and suggest that images may also be included to add further clarity and enhance group definitions.
- Post all definitions on chart paper.
- Consolidate to a "class explanation".

Assessment Tools and Strategies:

Assessment for Learning - Observation/notes, *consider*:
- group definitions reflect understanding of intended/unintended environmental consequences which result from human activity

Action

Preparing for Field Study
Large and small group activities (approximately 40 minutes)
- Suggest to students: We will be participating in a field study at a local waterway, where we can observe and gather data. Based on our observations and collected data, we hope to make a reasonably informed decision regarding whether the waterway is sustainable in its current state.
- As a large group, formulate questions to guide observations/data collection (Who uses/depends on the waterway, and in what ways? What features make a waterway sustainable?). Revisit and reference the class definition of a sustainable environment to reinforce understanding, as related to waterways.
- Post all questions on chart paper. Discuss and prioritize.
- Suggest that students examine images of similar waterways and note observations, in preparation for the field study.
- Organize students into small groups of three or four and distribute several images of waterways to each group.
- Allow time for observations/discussion amongst group members, based on the questions generated by the class.
- Invite comments and revisit questions, if needed.
- Ask students to consider some ways, other than noting observations, that you could use to present your observations/data while on the field study. Do you think a visual image is a good way to document observations? Why or why not? Would you find it helpful to bring (accessible) technology (digital camera, iPad, etc.) on the field study to record your observations?

Gathering Data through Observations
Small group and individual activities (approximately 60 minutes, depending on location)
- Discuss field study behaviour, protocols, safety prior to going outside.
- Distribute **BLM 2.1 – Field Study: Observing a Local Waterway**, along with a clipboard and pencil to each student.
- Suggest: Students record questions on **BLM 2.1** to guide their inquiry**.**
- Organize students into small groups.
- Suggest and encourage students/groups to generate and record additional, relevant questions throughout the field study.
- Distribute digital technologies to each group, if possible.**If using a note-taking app on an iPad (such as Evernote), suggest that students annotate notes as needed to highlight evidence. Suggestions: iNaturalist, Project Noah.
- Embark on the field study.
- Upon return, distribute **BLM 2.2 – Small Group Assessment** for each student to complete.

Assessment Tools and Strategies:
Assessment as Learning - BLM 2.2 – Small Group Assessment, *consider:*
- students' data collection practices

Consolidation and Debrief

Analyzing Observations, Examining Perspectives
Large, small group activities (approximately 40 minutes)
- Within their field study groups, ask students to consolidate all data, observations, images to complete **BLM 2.3 – Group Observations/Data: Field Study: Observing a Local Waterway.** Suggest that groups consider/incorporate information from **BLM 2.2** to improve collaboration as needed.
- If needed, ask students to consider the requirements of the plant and animal habitats/ecosystem along the waterway, plus the impact of local human activities on the surrounding natural environment. Based on these considerations, as well as gathered evidence, groups discuss whether the waterway seems sustainable in its current state.
- Ask each group to present their observations, data and position/perspectives.
- Create a large, class data collection chart by posting each group's **BLM 2.3** side by side.
- Discuss and highlight issues and perspectives that differ between groups.
- Suggest to students: Consider next steps to maintain/ensure/enable the sustainability of the waterway. Use your own understanding and build upon others' knowledge/ideas/solutions.

Exit Strategy
Large group and individual activity (approximately 15 minutes)
- Distribute **BLM 2.4 – Exit Card: Social Studies Inquiry: Is Our Local Waterway a Sustainable Environment?** to each student.
- Ask students to reflect on the challenges and successes throughout the field study as they relate the definition of a sustainable environment to their observations/data. Invite comments.
- Ask students to consider how human activities have an impact on the sustainability of the waterway. What are some next steps to enable/maintain/ensure its sustainability?
- Students complete **BLM 2.4** independently.

Assessment Tools and Strategies:

Assessment as Learning - BLM 2.4 – Exit Card: Social Studies Inquiry: Is Our Local Waterway a Sustainable Environment?*, consider:*

- students identify human activities which have an impact on the waterway, based on the data/evidence/information/images that were collected through field study
- students suggest a few activities which involve environmental stewardship to enable/maintain/ensure sustainability of the local waterway

Further Opportunities for Learning

Using Primary Sources to Establish Local/Provincial Initiatives

Students use a variety of primary sources (newspaper/magazine articles, policy documents, maps, interviews, etc.) to examine plans suggested by the municipal and/or provincial government related to sustaining natural resources, such as local waterways.

Considering Multiple Perspectives

Consider human activities from a variety of viewpoints, such as:
- the perspective of a Developer who wants to build low-cost housing on a woodlot;
- an environmental activist, concerned about the destruction of natural habitats;
- families who may benefit from affordable housing; and/or,
- community members who use local resources (a waterway) for leisure activities.

Students may orally debate or write a persuasive essay which advocates a particular perspective.

Related Resources and References

Websites

- Ministry of Education
  http://www.edu.gov.on.ca/eng/teachers/enviroed/education.html
- Ministry of Education
  http://www.edu.gov.on.ca/eng/curriculum/elementary/sshg.html
- Natural Curiosity
  http://www.naturalcuriosity.ca
- The Peel Water Story
  http://www.peelregion.ca/pw/waterstory/big_w_ideas.htm

References

Ministry of Education. Acting Today, Shaping Tomorrow; A Policy Framework for Environmental Education in Ontario Schools. Ontario, 2009

The Laboratory School at the Dr. Eric Jackman Institute of Child Study. Natural Curiosity: Building Children's Understanding of the World through Environmental Inquiry. University of Toronto (2011)

BLM 4.1 – Geographic Inquiry

1. Formulate Questions
   - Choose a topic that you might explore this year. Think of a good, open-ended question that students might choose to pursue.
   - Use the key concepts of geographical inquiry to guide your questions: are students exploring spatial significance? Patterns and trends? Interrelationships? Geographical perspectives?

2. Gather and Organize
   - Determine which resources students will need to explore the question, and what resources they have access to. How will students determine what information is relevant and valid?

3. Interpret and analyze
   - Which key concept(s) of geographical inquiry are students exploring by their question? This will determine how students can organize their data to allow for interpretation and analysis. (Eg. Rating scale for significance, Venn diagram for interrelationships, line graphs for patterns and trends)

4. Evaluate and Draw Conclusions
   - Think about how students will balance their findings to draw conclusions and make decisions. What criteria can students use to determine a good response or plan of action?

5. Communicate
   - Think about the media options for student communication. How might students put their ideas into action?

BLM 4.2 – The Story of My Product

Conduct research on the ecological footprint created by the production and use of a particular consumer product. Record information below, including sources for later reference.

Product:

1. Where do the materials for the product come from? Why there?	What materials, and how much energy, is used?

Source(s):

Book (author, title, publisher, date, page #); Article (author, title, journal title, date, volume/page #); Website (author, url, date); Other

2. Where and how is the product produced? Why there?	What materials, and how much energy, is used?

Source(s):

Book (author, title, publisher, date, page #); Article (author, title, journal title, date, volume/page #); Website (author, url, date); Other

3. Where is the product sold and consumed? Why there?	What materials, and how much energy, is used?

Source(s):

Book (author, title, publisher, date, page #); Article (author, title, journal title, date, volume/page #); Website (author, url, date); Other

4. Where is the product disposed of?	What materials are wasted, and how much energy is used?

Source(s):

Book (author, title, publisher, date, page #); Article (author, title, journal title, date, volume/page #); Website (author, url, date); Other

BLM 4.3 – Product Story Analysis

- Do you notice any patterns in the data that you have collected? Record patterns that you see below, and feel free to add other patterns that you notice:

1. Where are the materials coming from? Why there?

2. Where is the most energy used, and why there?

3. Where are the waste products disposed of? Why are they not reused/recycled?

4. Where do you see a want, rather than a need, being met? Where is energy used to meet a want rather than a need?

5. Other patterns?

BLM 4.4 – Action Plan

-Conduct research to determine things already being done to reduce the use of energy for the product. Put these items in the first column.
-Consider things that you think could be done to reduce the use of energy or waste. Put this in the middle column.
-Allow other students to add ideas, using the third column.

1. The extraction of materials for the product		
Things already being done:	My suggestions:	Student suggestions:
2. The production of the product		
Things already being done:	My suggestions:	Student suggestions:
3. The sale/consumption of the product		
Things already being done:	My suggestions:	Student suggestions:
4. The disposal of the product		
Things already being done:	My suggestions:	Student suggestions:

BLM 4.5 – Communication Checklist

How will you communicate your Action Plan to others? Choose a format to present your plan. Your choice may include one of the following:

- podcast
- web page
- social media
- interactive presentation
- promotional video
- Glogster
- other (pending approval by the teacher):

Be sure to include the following in your communication:

- A description or graphic organizer of the 'story' of their product (from the extraction of materials, through the production, consumption, and disposal of the product)
- Details of the plan itself (who and what is to be changed in the process)
- Details of how the plan will effect change (reduction in energy use, waste, etc.)
- An explanation of how the plan could be expanded to include other people
- A summary of how the plan will help to reduce the ecological footprint of those that use it

BLM 4.6 - Project Rubric

	Level 1	Level 2	Level 3	Level 4
Understanding	- demonstrates a limited understanding of the environmental impact of products, by providing minimal information that is accurate and relevant - uses minimal appropriate vocabulary	- demonstrates some understanding of the environmental impact of products, by providing some information that is accurate and relevant - uses a limited range of appropriate vocabulary	- demonstrates a strong understanding of the environmental impact of products, by providing sufficient information that is accurate and relevant - uses a range of appropriate vocabulary	- demonstrates an in-depth understanding of the environmental impact of products, by providing extensive information that is accurate and relevant - uses a broad range of appropriate vocabulary
Thinking	- conducts research and considers questions that are rarely accurate, relevant, specific, and challenging - creates a plan that offers minimal practicality and effect	- conducts research and considers questions that are sometimes accurate, relevant, specific, and challenging - creates a plan that is somewhat practical and effective	- conducts research and considers questions that are usually accurate, relevant, specific, and challenging - creates a plan that is practical, sufficient, and effective	- conducts research and considers questions that are consistently accurate, relevant, specific, and challenging -creates a plan that is practical, thorough, and highly effective
Communicating	- organizes few of the required elements (the story, the stakeholders, the plan, an application to the community, and an explanation of how it helps the environment) in a sequence - uses language that is rarely clear and effective, and/or that contains several errors, to communicate information	- organizes some of the required elements (the story, the stakeholders, the plan, an application to the community, and an explanation of how it helps the environment) in a sequence that is somewhat effective - uses language that is sometimes clear and effective, with some errors, to communicate information	- organizes all or most of the required elements (the product story, the stakeholders, the plan, an application to the community, and an explanation of how it helps the environment) in a logical sequence - uses clear and effective language, with few to no errors, to communicate information	- organizes all of the required elements (the story, the stakeholders, the plan, an application to the community, and an explanation of how it helps the environment) in a sequence that is highly effective - uses language that is highly effective and persuasive, with no errors, to communicate information
Application (Geography)	-identifies and responds to few geographical patterns and changes in geographical contexts -applies few to no geographical concepts to real-life situations with minimal effect	-identifies and responds to simple geographical patterns and changes in geographical contexts -applies a limited range of geographical concepts to real-life situations with some effect	-identifies and responds to several geographical patterns and changes in geographical contexts -applies a range of geographical concepts to real-life situations effectively	-identifies and responds to complex geographical patterns and changes in geographical contexts -applies a broad range of geographical concepts to real-life situations effectively
Application (Media Literacy) (optional)	- makes minimal use of strategies and techniques specific to the chosen format	- makes limited use of strategies and techniques specific to the chosen format	- makes effective use of strategies and techniques specific to the chosen format	- makes extensive use of strategies and techniques specific to the chosen format

BLM 4.7 – Sample Product Story

Conduct research on the ecological footprint of your product, and record your information below. Be sure to record your sources so that you can refer to them later.

Product: Apple's iPhone 4

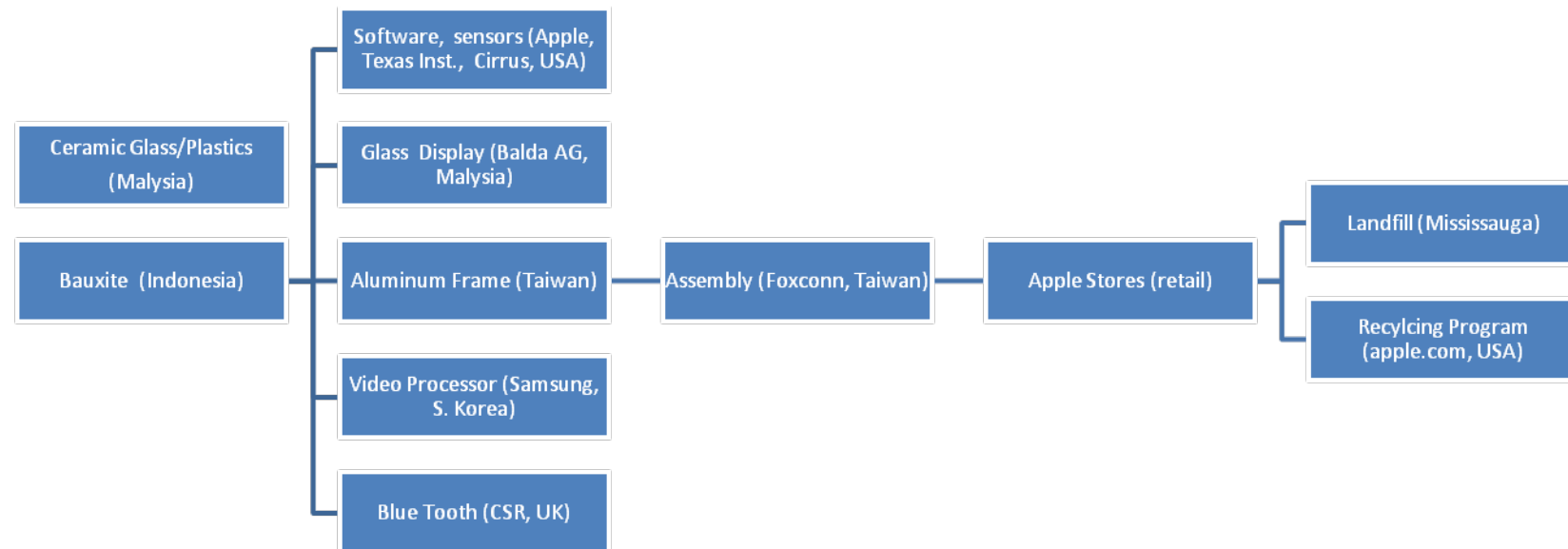| 1. How/where are resources extracted?	Energy/Resources used?
-Aluminum potentially from Indonesia -Ceramic Glass/plastic parts potentially from Malaysia	-mining equipment -transportation (boat)
Source(s): http://www.mapsofindia.com/india-natural-resources.html; http://www.balda.de/ Book (author, title, publisher, date, page #); Article (author, title, journal title, date, volume/page #); Website (author, url, date); Other	
2. How/where is it produced?	Energy/Resources used:
-Foxconn, Taiwan (assembly) -Apple, Texas Inst., Cirrus, USA (software, senors) -Balda AG, Malysia (plastic/glass) -Samsung, S. Korea (video processor) -CSR, UK (Bluetooth module)	-machines in factory -labour -transportation of parts to factory -technicians
Source(s): http://www.apple.com/iphone/design/; http://www.manufacturingdigital.com; http://operationsbuzz.com/2010/11/the-iphone-4-supply-chain/; http://www.youtube.com/watch?v=ck4XUnsfBuQ Book (author, title, publisher, date, page #); Article (author, title, journal title, date, volume/page #); Website (author, url, date); Other	
3. How/where is it sold/consumed?	Energy/Resources used:
-Apple stores (Canada, USA) -online (Apple.ca)	-transportation -packaging -staff/store expenses
Source(s): http://apple.com/ca Book (author, title, publisher, date, page #); Article (author, title, journal title, date, volume/page #); Website (author, url, date); Other	
4. How/where is it disposed of?	Energy/Resources used:
-landfills (Mississauga) -recycled (various computer shops) -recycled (online, through Apple)	-transportation -processing
Source(s): http://www.apple.com/recycling/ipod-cell-phone/ Book (author, title, publisher, date, page #); Article (author, title, journal title, date, volume/page #); Website (author, url, date); Other	

Life Story of an iPhone 4

Extraction of Raw Materials	Production (of parts)	Assembly	Retail/ Consumption	Disposal/ Recycling

Software, sensors (Apple, Texas Inst., Cirrus, USA)

Ceramic Glass/Plastics (Malysia)

Glass Display (Balda AG, Malysia)

Landfill (Mississauga)

Bauxite (Indonesia)

Aluminum Frame (Taiwan)

Assembly (Foxconn, Taiwan)

Apple Stores (retail)

Recylcing Program (apple.com, USA)

Video Processor (Samsung, S. Korea)

Blue Tooth (CSR, UK)

iPhone Action Plan Ideas

Target Area	Plan
1. Product Use	Reduced-use Ad Campaign
2. Disposal/ Recycling	School –based Phone Recycling Program
3. Manufacturing (ethical concerns)	Letter Writing Program