

**Locally Developed Course**  
**Grande Yellowhead Public School Division**

**Water Experience**  
**25**

**Parks Canada (Palisades) Stewardship Education Centre**

**Student - Pre-Immersion Course Package**



*Overview of Water Experience Course*

The objectives of this course are to build water navigation skills, aquatic ecosystem knowledge and leadership skills in a context of critical thinking. We feel that this is particularly important as we strive to better educate youth for

their own safety and as ambassadors for our wild places. It also highlights best practise methods for inquiry research, problem solving and analysis.

## General Outcomes

1. Students will demonstrate understanding of potential hazard awareness and mitigation in mountain recreation activities.
2. Students will understand and communicate ecological integrity as it relates to the long term functioning of protected lands and watersheds.
3. Students will recognize the historical importance for Alberta and Canada of the Rocky Mountain natural region.
4. Students will apply a variety of specialist technology and/or equipment to understand, collaborate, communicate and increase skill development.
5. Students will develop an understanding that demonstrates an appreciation and value for the mountain parks environment.

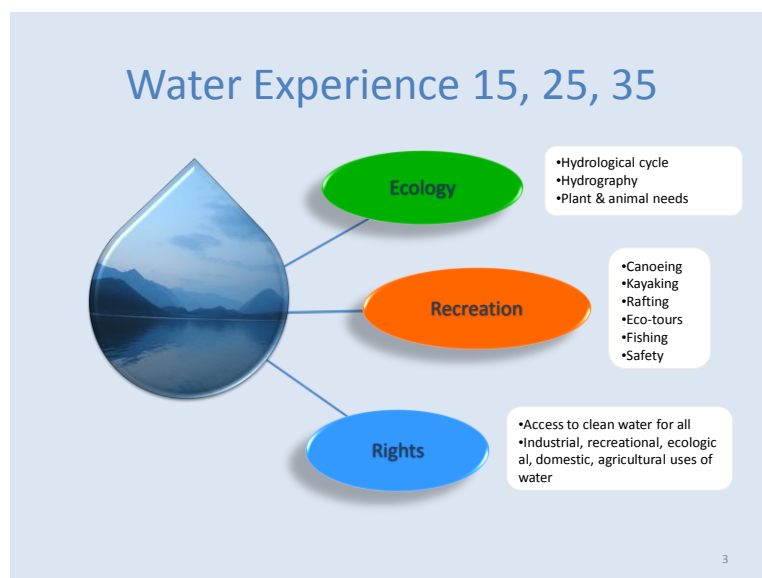
**Pre-immersion sessions:** Four hours of classroom-based sessions. Included in this teacher package is a PowerPoint presentation divided into 5 sessions for use during the pre-immersion course. Other resources needed for the delivery of the course can be found in more detail in the Instructor Notes that follow.

**Immersion sessions:** Delivered on-site at the Parks Canada Palisades Stewardship Education Centre near Jasper, Alberta, these sessions will require students to stay in residence at the PSEC site for four days of programming, usually running 8h00 to 21h00. This portion of the course is very hands-on and will require full participation by students. PSEC staff, including interpreters and other Parks Canada personnel, will be on-site to deliver the programming, but teacher chaperones will be needed as well during this time. The 35 level course mainly takes place off-site and is described as a journey. Exact locations will be decided upon by the PSEC facilitators who will base their decision on the weather, group's abilities, and other safety factors.

**Post-immersion sessions:** Three more hours of classroom-based sessions will be facilitated in the same way as the pre-immersion sessions. Students will link what they experienced and learned in Jasper with what is happening in their home communities or regions. A major culminating project is part of the final student assessment and will usually involve sharing with people outside the course.

## Session 1

1. Look at the first PowerPoint slide. there are three main water topics that will be covered in this course. Take 5 minutes to discuss the following:
  - Water **Ecology** refers to the hydrological cycle, hydrography (where the water is) and basic plant and animal needs related to water. This has been discussed briefly in Water Experience 15 but will be the main focus in the 25 level course.
  - Water **Recreation** will be present throughout the three levels, but will of course take place mainly during the Immersion portion of the course. In the 15 level, students were introduced to canoeing, kayaking, and rafting. In the 25 level, students will be kayaking and canoeing while working on ecosystem monitoring activities. In the 35 level course the main activity of the Immersion portion will be the planning and execution of a two night trip on Maligne Lake while kayaking or canoeing.
  - Water **Rights** will also be a main area of concern during all three levels, and we will be looking at some heavy issues in the pre and post portions of the courses. One of the main resources that will be referred to during Water Experience 15, 25 & 35 is *Eau Canada*, a Canadian book from 2007, edited by Karen Bakker.



2. The following diagram shows the topics that will be covered in the pre-immersion sessions. The optional fifth session will be a video-conference with the Parks Canada Palisades Stewardship Education Centre (PSEC) staff to let you know about the Immersion portion of the course.

## Water Experience 25 Guiding Questions

Water Use	<ul style="list-style-type: none"> <li>• Who uses water? What for? Are there other stakeholders?</li> </ul>
Water Conservation	<ul style="list-style-type: none"> <li>• What are the major problems facing Canadian water?</li> </ul>
Water Safety	<ul style="list-style-type: none"> <li>• What hazards to human and ecosystem health exist?</li> </ul>
Aquatic Monitoring	<ul style="list-style-type: none"> <li>• How do we know the water is clean? How do we know the ecosystem is healthy?</li> </ul>

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3. Recreational activities such as whitewater kayaking, rafting or canoeing are surely the most exhilarating way to "use" water. Although the water that you will have the chance to explore in the Immersion portion of this course are not quite Class V (they are flat water), they will be exciting.

Not surprisingly, some of the biggest supporters of river protection initiatives are the people who use the rivers. Look at the following 4 min. video clip from National Geographic. Click on the link at the bottom of the PowerPoint slide.

### **Final Ride on Yangtze River Rapids?** (April 23, 2009)

<http://news.nationalgeographic.com/news/2009/04/090423-yangtze-ride-video-wc.html>

After watching the clip, discuss some of the following questions and come up with more of your own.

- How do you feel after watching this clip?
- Is China justified in creating so many massive dams? Why or why not?
- In other areas where rivers flow through several different countries, is a country upstream justified in building a dam to provide water (or electricity) for its people? What would you do if you were a country downstream of a massive project?
- What steps do you think need to be followed when considering building a dam or diversion on a river?
- What benefits can eco-tourism provide for a community?
- Can ecological health, eco-tourism, and conservation outweigh the benefits gained by building dams?

Other related NG articles & videos you may want to show:

Article: *Last River Porpoises Dying in Polluted Yangtze*

Video: *Glen Canyon Controversy*

Video: *Great Lakes Cleanup*

4. Watch the video *49 Megawatts*, (5 min clip - <http://www.youtube.com/watch?v=WPtdgUqr4o>) a documentary made about the damming of the Ashlu River in B.C. The full video will last 31 minutes, so watch about half this class and finish it next time. You will need to write a reflective piece based on this video so its a good idea to take notes while you watch
5. Look at the for Recreational Opportunities assignment. Read it over together and ensure that the students understand what they are being asked to do.

There are a lot of recreational activities that take advantage of water environments. Think back to WE 15 and **research** one of the following non-motorized sports:

- Canoeing: flatwater or whitewater
- Kayaking: slalom, freestyle, kayak polo, ocean or lake touring
- Rafting
- Stand up paddle boarding
- *or* suggest another appropriate sport (discuss it with your instructor first)

1. Tell us why you chose to profile this sport.

- What experience do you have with this sport?
  - Show us any pictures or video you may have of yourself engaged in it.
  - Tell us about someone you know who participates in this sport.
- If this sport is totally new to you, what have you seen or heard that makes you interested?

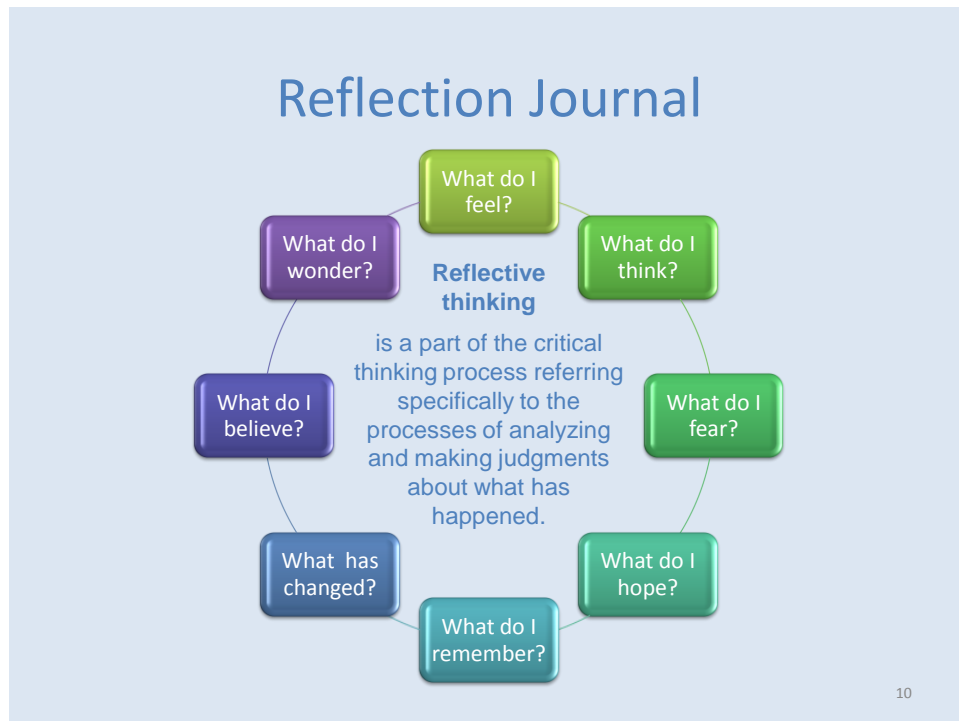
2. Try to find the following information:

- Who are some of the champions of the sport?
- How do you know about them?
- What do they do to earn the title of "champion"?
- Is it a competitive sport? If so, at what level could you compete at? (Local? International?)

Be prepared to share what you discover next class. You can do a simple oral presentation with a few visual aids (photos, etc.), or make use of some form of technology to present your findings. Make it interesting!

## Session 2

1. Reflective journaling will be a big part of the Immersion and Post-immersion portions of the course, and you are encouraged to write down any insights they have at any time. Go over the PowerPoint slide on reflective thinking.



2. Continue with the *49 Megawatts* video. Remind students that the reflection piece they will need to write after this class (or during class, if there is enough time) will need to describe what they have felt and thought about as they watched this video.
3. After the video, take 5 - 10 minutes to discuss. The length of the written response needn't be overly long, and may include sketches.
4. The *49 Megawatts* movie looked at the impacts of micro-hydro development on recreational opportunities in B.C. Next you are going to present your findings on Recreational Opportunities related to one of the watersports that they will be trying out at the PSEC in the Immersion portion of this course.

*"Our reflections are the making of deeper meaning and richer understandings. Our reflections are our dreams, our ideas, our questions, our initiatives, our visions – our journeys of lifelong learning and teaching." (Schwartz & Bone, 1995)*



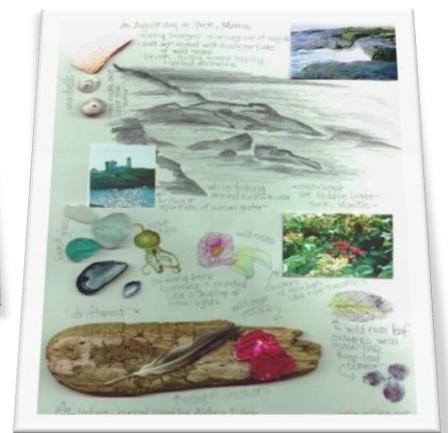
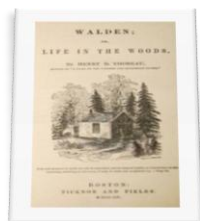
- Take time to write down anything in relation to what you have experienced. If you're intrigued by certain statements or if you're attracted to issues or problems, write your response. Try to take at least five minutes to write when you've finished an activity or assignment.
- Make connections with your own experience. What does the reading make you think of? Does it remind you of anything or anyone?
- Make connections with texts or concepts or events. Do you see any similarities or differences?
- Ask yourself questions: What perplexes you about a particular issue / event / text? Try beginning, "I wonder why..." or "I'm having trouble understanding how..." or "It perplexes me that..." or "I was surprised when..."
- Try agreeing with the writer / speaker. Write down the supporting ideas. Try arguing with the writer / speaker. On what points, or about what issues, do you disagree? Think of your journal as a place to carry on a dialogue. Ask questions; have the writer / speaker respond. What happens when you imagine yourself in his/her shoes?
- Write down striking words, images, phrases, or details. Speculate about them. Why did the author /speaker choose them? What do they add to the story? Why did you notice them? Divide your notebook page in half and copy words from the text onto the left side; write your responses on the right. On a first reading you might put checks in the margin where the passages intrigue you; on the second reading, choose the most interesting ideas, then write about them.
- Describe the author / speaker' point of view. How does his / her attitude shape the way s/he presents the material?
- - Tell about what happened.
  - Ask questions about things that confuse you or that you wonder about.
  - Describe your feelings about the events.
  - Describe your feelings about people you have met / heard from.
  - Copy down a quote from a speaker and tell why you think it's meaningful.
  - Describe your favourite part of a text / movie / presentation / activity.
  - Make a prediction about what will happen in the future.
  - Tell how you would react if you were one of the "characters" in the story.
  - Describe something that surprised you.
  - Write a letter to the author / speaker / character.
  - Draw pictures or create graphic organizers.



- Today I explored..... and found.....
- I think it is important to know about.....because...
- Today I discovered..... and.....
- With the learning I did today I will be able to...
- Today I learned .....
- I wonder how .....?
- I wish.....because...
- I feel..... because....
- The most challenging thing I did today was...
- Today I found out...
- I smiled today when...
- This new learning will affect me in the following ways..
- I think the causes of..... are.....
- I could use these strategies to solve the problem of...
- The consequence of the changes I have suggested would be...
- I want to know more about ... and I will find out more by firstly..... then ..... and perhaps...
- The work we did today built on the work we did .....(insert time)..... in that it...(explain how) .....,
- At the end of today I am still uncertain about.. I get the bit about.. but need to clarify the bit about..
- The learning we did in ..... relates to our previous learning in the following ways...
- I left class today knowing several things that I didn't know when I arrived this morning....(list them)
- I will use the skills gained in .....today in my everyday life (list the ways) ....
- The biggest obstacle I overcame today was..... I did this by.....
- (insert famous person) would say that... (insert issue/concept/learning) is .... because.....
- I feel that the six most important learnings from today in order of importance were..... because...
- In my opinion the following changes need to be made ..... as .....
- My understanding of..... is...
- I can now explain why/how... it....
- I agree with the statement '.....' because...
- I disagree with the statement '.....' because ...
- The difference between .....& ..... is.....
- I would like answers to the following questions...
- I know ..... because...
- Today I asked... and discovered...
- The strengths and weaknesses of ..... are...
- Today I explored..... and feel.....
- I believe...

## Consider keeping a nature journal

1. Firsthand experience is crucial to connecting with nature.
2. Develop a routine or schedule for recording observations.
3. Always have a notebook with you to record and sketch your observations.
4. Make very simple sketches, maps and diagrams to enhance your learning and jog your memory.
5. Use your observations to write finished essays or create finished drawings or other creative work.





1. Start by reading going through the **Anticipation Guide** then read "Drawers of Water: Water Diversions in Canada and Beyond" By Frédéric Lasserre, chapter 7, pages 143 - 162 in *Eau Canada* (2007).

An anticipation guide is a tool that has statements that may be true (taken directly from the text) or false. It will give you an idea of what they are about to read and will introduce some of the key concepts. It also gets you to make judgments before reading and also after reading. It is a good way to see shifting beliefs as you gain more understanding. Discuss as you go and feel free to spend less time on certain parts and more time on others that the students find interesting.

### *Drawers of Water: Water Diversions in Canada and Beyond* WE25 Anticipation Guide

by Frédéric Lasserre pages 143 - 162 in *Eau Canada* (2007)

Directions: On the continuum in front of each of the numbers, place an "x" that indicates where you stand in regard to the statement that follows. Be prepared to defend and support your opinions with specific examples. After reading the text, compare your opinions on those statements with the author's implied and/or stated messages.

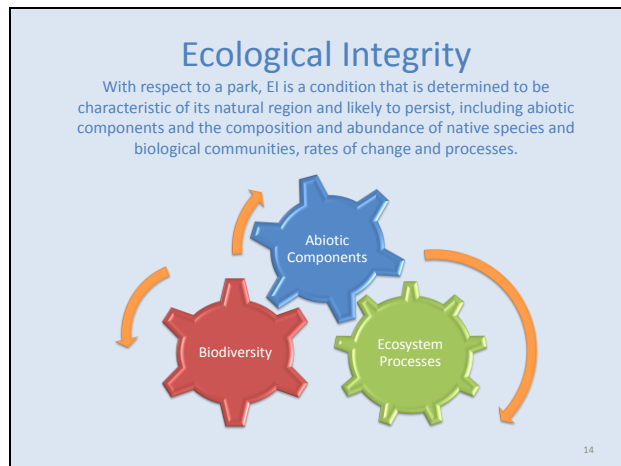
Strongly Agree

Strongly Disagree

- |  |   |
|--|---|
|  | 1. Large scale water diversions (taking water from one watershed and putting it into another) are necessary to the growth and development of Canada.                      |
|  | 2. Canada is one of the largest water diverters in the world.   |
|  | 3. Most water transfer schemes are designed to produce power, rather than to irrigate or to provide water for domestic use.   |
|  | 4. Diverting water that normally crosses political boundaries would be a political nightmare.   |
|  | 5. Canada has a strong case when it says that water exports (to other countries) should be prohibited based on environmental grounds.                                     |
|  | 6. When the states in the Columbia & Mississippi watersheds refused the idea of exporting their water to other states, engineers started looking North to Canada's water. |
|  | 7. Political opposition has played an important role in discouraging water exports.   |
|  | 8. Water demand has been stagnating in the U.S for the past two decades, resulting in an end to new diversion schemes.  |
|  | 9. It would be a good idea if Canada and the U.S. considered pooling their natural resources: energy, wood, minerals, and water.  |
|  | 10. Small diversions to supply drinking water are no big deal and should always be allowed.   |

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|--|--|
|  | 11. The fear is that if one province allows bulk water exporting, then all provinces will have to consider water as a tradable good under the North American Free Trade Agreement. |
|  | 12. We are on the right track when we implement laws that prohibit interbasin water transfers.   |
|  | 13. Water diversions & transfers are no longer a major concern.  |

2. After reading the chapter in groups or individually, look at the anticipation guide form again to see if your beliefs have changed after reading the text. Discuss if there have been changes and if there have been, were there significant changes? Since the beginning of this course, have you changed your mind about any water-related issues?
3. Now we begin learning about a major component of the Water Experience 25 level course: Aquatic Monitoring. Look at the PowerPoint slides and discuss what the students already know about ecological integrity and monitoring techniques. Do they know what scientists look for when they "measure" water?



### **Abiotic Components**

- The physical elements in an ecosystem.
- For example: water, rocks and nutrients.

### **Biodiversity**


- The composition and abundance of species and communities in an ecosystem.
- For example: tundra, rainforest and grasslands represent landscape diversity.
- For example: black bears, brook trout, ruffed grouse and black spruce represent species diversity.

### **Ecosystem Processes**

- The engines that make ecosystems work.
- Usually associated with natural events.
- Are needed to sustain ecosystems.
- For example: fire, flooding and predation.

### Aquatic Monitoring

Monitoring involves collecting and analyzing information on the state of the resources in order to identify changes and trends over time. An integral part of scientific research, it is also a means of verifying whether policies and programs are having the desired results.



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4. Look through the vocabulary worksheet, these topics will be discussed in depth.

Vocabulary

WE25 Assignment

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Use words and sketches to define the following terms. Use the following websites (or any other ones that you trust) in addition to what you already know to complete this assignment.  
*This assignment must be handed in during the second post-immersion class as you may want to add to your definitions during your time at the PSEC.*

Ecological Integrity Concepts

Parks Canada: [http://www.pc.gc.ca/apprendre-learn/prof/sub/edukit/activities/index\\_2\\_e.asp#1](http://www.pc.gc.ca/apprendre-learn/prof/sub/edukit/activities/index_2_e.asp#1)

Biodiversity:

Carrying capacity:

Ecosystem stressors:

Sustainable development:

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Traditional ecological knowledge:

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## Vocabulary

## WE25 Assignment

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Ecological integrity:

<http://www.pc.gc.ca/eng/progs/np-pn/ie-ei.aspx>

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List the 3 components of ecological integrity. Include a brief definition and some examples of each:

- 1.
- 2.
- 3.

## Water Treatment Concepts

Access Water Knowledge at: <http://www.wef.org/awk/default.aspx>

Glossary of Water Terms: <http://www.wef.org/PublicInformation/page.aspx?id=139>

Grey water:

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Biosolids:

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Nutrients:

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Microconstituents:

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## Vocabulary

## WE25 Assignment

Watershed management:

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Collection system:

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Water reuse:

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## Common Water Measurements

<http://ga.water.usgs.gov/edu/characteristics.html>

Temperature:

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pH:

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Turbidity:

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Dissolved oxygen:

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Hardness:

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5. Reading assignments (3 possibilities to choose from):

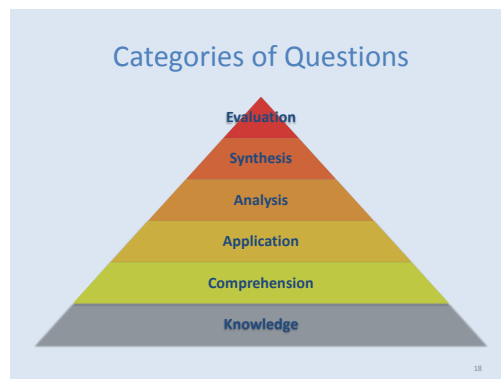
- Hand out several copies of the EPA Water Info booklet for Youth: **What's Up With Water?** one copy for 2 - 3 students. This brochure is from the US and is designed it still gives a simple yet complete overview of water monitoring and ecosystem
- If the group is large, you may want to also hand out the Waste Water Treatment **Flow** booklet to give students more to work with. This brochure is much more would be a challenging text for some. It does, however, have excellent on wastewater treatment.
- If you have access to the internet for each group, you could have them read some **Matters** site (an NGO site dedicated to protecting Alberta's Watersheds) at <http://www.water-matters.org/program/share-the-water>. Click on **Learn**.



**Our Nation's**  
for youth, but  
health.  
**Following the**  
complex and  
information  
of the **Water**

Read over the information in their booklet / on the website together. After, create questions to test other students. Discuss the difference between a simple question (at the bottom of the pyramid) and a complex one before letting them begin. *See the following information sheet on Bloom's taxonomy.*

Students must have the answers to their questions ready. Ask students to come up with simple, straight-from-the-text questions as well as higher-level questions which ask for opinions and justifications (which will not necessarily come from the text).



6. If there is time, play a Jeopardy-style game with the questions that were developed. Teams score points for correct answers and also for developing great thought-provoking questions. Save this activity for the next class if there is not enough time.

Bloom's Taxonomy

Competence	Skills Demonstrated
<b>Knowledge</b>	observation and recall of information knowledge of dates, events, places knowledge of major ideas mastery of subject matter <i>Question Cues:</i> list, define, tell, describe, identify, show, label, collect, examine, tabulate, quote, name, who, when, where
<b>Comprehension</b>	understanding information grasp meaning translate knowledge into new context interpret facts, compare, contrast order, group, infer causes predict consequences <i>Question Cues:</i> summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss
<b>Application</b>	use information use methods, concepts, theories in new situations solve problems using required skills or knowledge <i>Questions Cues:</i> apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, discover
<b>Analysis</b>	seeing patterns organization of parts recognition of hidden meanings identification of components <i>Question Cues:</i> analyze, separate, connect, classify, arrange, divide, compare, select, explain, infer
<b>Synthesis</b>	use old ideas to create new ones generalize from given facts relate knowledge from several areas predict, draw conclusions <i>Question Cues:</i> combine, integrate, modify, rearrange, substitute, plan, create, design, invent, what if?, compose, formulate, prepare, generalize, rewrite
<b>Evaluation</b>	compare and discriminate between ideas assess value of theories, presentations make choices based on reasoned argument verify value of evidence recognize subjectivity <i>Question Cues:</i> assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, summarize

<http://www.coun.uvic.ca/learning/exams/blooms-taxonomy.html>

## Session 4

1. The first activity is to look at a 16 minute video clip on water infrastructure. Go to <http://www.liquidassets.psu.edu/index.html#overview> to see the Overview clip. The entire documentary (90 minutes) is available to order if you like. Remember to take notes in your folders as this may be something you want to comment on in the post-immersion assignments.

After viewing the clip, tackle some of the following questions:

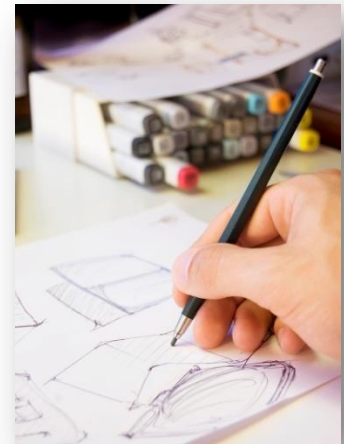
- Does it make sense for communities with an abundant water supply to follow the same kind of water conservation policies and practices as a desert community? Why or why not?
  - If a growing community in the Sahara decides to follow the example of Las Vegas in conserving its water, to what extent can this be possible? Suggest some alternatives by which it may stretch its water resources.
  - A city with sufficient amount of water resources has decided to cut down on its water usage in view of future depletion. Your class is one of the citizen action groups it consulted. What would you advise the citizens and the government to do?
  - What can citizens do to help sustain their water resources?
  - The environmental group in this video educates people through community meetings. What other modes do you think should be employed for effective communication?
  - Should citizens be responsible for or should they cooperate in the management of water resources?
  - What are the different reasons for which a regular supply of water is important to a civilized community?
  - “Water supply is set to become a bone of contention among communities”. Research the validity of this statement and discuss it with your classmates.
  - Investigate your local water supply system. How is it similar to and/or different from the supply system discussed in this segment of Liquid Assets?
  - Identify the different infrastructure components that are involved in the transportation of water from the source to you.
  - Why is it important to take wastewater away after it is used?
  - What are the direct or indirect causes of water pollution today?
  - What are some of the age-old methods of water purification?
  - Discuss the possibilities and modes of a global impact of local water pollution.
  - This segment of Liquid Assets discusses the impact of unsafe water on the citizens who consume it. But human beings are only one part of the ecosystem this water reaches. List the other parts and discuss the possible impact on them.
  - How do runoff, sewage and trash become a part of our watershed?
  - What is the impact of watershed pollution on the environment?
  - What can citizens do to avoid watershed pollution?
  - How far does the impact of watershed pollution reach?
2. In Canada, some of the same infrastructure problems exist, especially in small communities and on First Nation reserves. The following websites give some background information on the First Nations Reserves situation:
- Health Canada information on Water Quality issues on First Nation Reserves  
<http://www.hc-sc.gc.ca/fniah-spnia/promotion/public-publique/water-eau-eng.php>



## Response Journal Guidelines

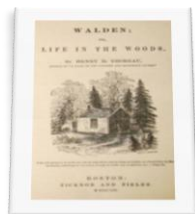
## WE25 Background Information

- Tell about what happened.
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- Describe your feelings about the events.
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by Frédéric Lasserre pages 143 - 162 in *Eau Canada* (2007)

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Strongly Agree

Strongly Disagree

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2. Canada is one of the largest water diverters in the world.

3. Most water transfer schemes are designed to produce power, rather than to irrigate or to provide water for domestic use.

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6. When the states in the Columbia & Mississippi watersheds refused the idea of exporting their water to other states, engineers started looking North to Canada’s water.

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8. Water demand has been stagnating in the U.S for the past two decades, resulting in an end to new diversion schemes.

9. It would be a good idea if Canada and the U.S. considered pooling their natural resources: energy, wood, minerals, and water.

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### Ecological Integrity Concepts

Parks Canada: [http://www.pc.gc.ca/apprendre-learn/prof/sub/edukit/activities/index\\_2\\_e.asp#1](http://www.pc.gc.ca/apprendre-learn/prof/sub/edukit/activities/index_2_e.asp#1)

Biodiversity:

Description	Sketch

Carrying capacity:

Description	Sketch

Ecosystem stressors:

Description	Sketch

Sustainable development:

Description	Sketch

Traditional ecological knowledge:

<i>Description</i>	<i>Sketch</i>

Ecological integrity:

<http://www.pc.gc.ca/eng/progs/np-pn/ie-ei.aspx>

<i>Description</i>	<i>Sketch</i>

List the 3 components of ecological integrity. Include a brief definition and some examples of each:

- 1.
- 2.
- 3.

## Water Treatment Concepts

Access Water Knowledge at: <http://www.wef.org/awk/default.aspx>

Glossary of Water Terms: <http://www.wef.org/PublicInformation/page.aspx?id=139>

Grey water:

<i>Description</i>	<i>Sketch</i>

Biosolids:

<i>Description</i>	<i>Sketch</i>

Nutrients:

<i>Description</i>	<i>Sketch</i>

Microconstituents:

<i>Description</i>	<i>Sketch</i>

Watershed management:

<i>Description</i>	<i>Sketch</i>

Collection system:

<i>Description</i>	<i>Sketch</i>

Water reuse:

<i>Description</i>	<i>Sketch</i>

## Common Water Measurements

<http://ga.water.usgs.gov/edu/characteristics.html>

Temperature:

<i>Description</i>	<i>Sketch</i>

pH:

<i>Description</i>	<i>Sketch</i>

Turbidity:

<i>Description</i>	<i>Sketch</i>

Dissolved oxygen:

<i>Description</i>	<i>Sketch</i>

Hardness:

<i>Description</i>	<i>Sketch</i>

