



**For Educators**

**Sc and SS Middle Elementary**

**Do We do That?**

To investigate humanities relationship with their environment.

**Big ideas:**

**Science 5:**

- 1) The nature of sustainable practices around BC's resources
- 2) First Peoples concepts of interconnectedness in the environment
  - everything in the environment is one/connected (e.g., sun, sky, plants and animals) and we have a responsibility to care for them

**Socials Studies 5:**

- 1) Resources and economic development in different regions of Canada;
- 2) First Peoples land ownership and use
  - How do First Peoples balance economic development with traditional uses of the land?

**Socials Studies 6:**

- 1) Economic self-interest can be a significant cause of conflict among peoples and government.
- 2) Complex global problems require international co-operation to make difficult choices for the future

**Objectives:** In this activity students will investigate interconnectedness as they look at some activities that occur on the land. Students will then propose a plan for their area by attempting to balance socio-economic and environmental needs. Lastly, they will advocate for their plan – thus becoming a Stewards for their region.

**Key Guiding question:** To what extent can human activities be sustained in our watersheds?

**Key terms:** Interconnectedness, sustainability, stewardship, land use, sustainable development.

**Time required:** 2-3 classes

**Background:**

Water drops come from the air, land on the ground and flow downhill. Some water soaks into the ground (groundwater) where it also flows downhill – we just can't see it unless we dig a well or find a spring. Little flowing water drops collect to make streams; little streams merge to make bigger streams; streams collect to make rivers, and rivers run into lakes or the ocean. Ultimately all water collects in the oceans. Areas on land where water collects, cycles and flows are called Watersheds. A Watershed analogy could be a bathroom sink where all the water collects and "funnels" to a common drain.

Everyone and everything on land is part of a watershed. They can be small like a tiny inland puddle or lake or cover large regions like the Fraser River Basin. All human activity that occurs on the land, called land use, occurs in watersheds. The way water moves and flows, what we do upstream can have an impact downstream – including under the ground. If many upstream activities occur in different parts of a watershed, many downstream impacts are likely to be observed. Healthy functioning watersheds provide clean water for drinking, agriculture and manufacturing, they offer opportunities for recreation and tourism, and they provide the habitat for the plants and animals that help sustain communities. They are fundamentally important to our economy, society and environment.

Watersheds are dynamic landscapes; their function can be positively and negatively impacted by land use: ie agriculture, forestry, mining, recreation, and the expansion of cities/ towns, has an impact on the land ie water quality, amount of natural areas, mammal habitat, etc. Are watersheds unlimited in their ability to function well as more and more human activity occurs within them? Can we do whatever we want, wherever we want and expect watersheds to maintain their



ability to provide the good and services many parts of our economy, society and environment depend? How can we balance all that we do, while still maintaining other important aspects of our landscapes and communities?

The answer lies in planning, so that, in the future we can increase our chances of having what we want, both environmentally, and socio-economically.

As the world's population continues to grow and resource demands increase, there are limits that the natural environment can sustain. Our watersheds are becoming more and more crowded leading to more and more conflict over what activities can occur and where.

Young people are the recipients of today's land use decisions. As youth share their learning, they can inspire the community to take-action. BC Tomorrow provides a mechanism for the community and schools to interact.

**The BC Tomorrow Simulator:** – [www.bctomorrow.ca](http://www.bctomorrow.ca)

Go to [www.bctomorrow.ca](http://www.bctomorrow.ca) and create an account. You must have an email address to confirm.

Scenario options to choose:

- 1) **Historic** – shows what the landscape looked like 100 years ago and how it's changed over time. Has our community and natural landscape always looked like it does now?
  - The Historic scenario is very helpful for learning how parts of the system interact – the human, economic and environmental parts. Students first learn about cause and effect **relationships** at work in watersheds (in natural systems).
  - The overall system is more complex, but students start to learn about interconnectedness.
  - Are there any concerning trends (landscape/land use and/or indicators)?
- 2) **Business as Usual (BAU)** - shows what the landscape (and indicators) could look like in the future if we keep doing what we're doing.
  - Are there any concerning trends (landscape/land use and/or indicators)?
- 3) **Land Use** – Students can address trends identified during the BAU and Historic scenarios as they create their own future.
  - Decisions made today will impact your (students) lives. What are you going to do about the results of your observations/trends?
  - Creating future scenarios gives users a chance to set their own goals for the parts of the system (indicators) and then try to reach them by planning.

Student Plans can be whatever themes they are able to justify to their peers/teachers/family members/community:

- Collaborate and come to a consensus with a partner, a group, or a class on a balanced plan. Then share it with peers/teachers/family members/community ... and put your plan into action.
- Advocate for a specific sector and share it their plans.

Other options include:

- 4) **Go on a Quest** - Extend learning beyond the classroom
- 5) **Take a field or water quality observation** in your area and upload the observation to support learning.
- 6) **Complete a report** and share understandings



**For Students**

**Do We do That?**

**PART 1 What is land-use?**

- 1) Login to BC Tomorrow. Go to [www.bctomorrow.ca](http://www.bctomorrow.ca) login as a student and create an account. You must have an email address.
- 2) Watch “Introduction” under the “*Tutorials. How to.*” in the video tab.

a. Give examples of human land-use and explain, in general, their impacts on the land and ecosystems

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b. Based on the video examples, list four human land use activities found in your communities.

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c. What could the land look like in the future?

i. What has happened to BC’s population in the last 100 years?

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ii. When population rises, what happens to natural resource extraction and the landscapes?

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iii. What does Sustainable development mean?

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iv. What does the narrator mean when she says land-use produces positive and negative effects?

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v. How does the narrator suggest we can we achieve sustainable development in BC?

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vi. Do modelling tools like BC Tomorrow **actually** predict the future?

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3) What are watersheds? Watch the “Watersheds” video under the “*Understanding the landscape*” in the video tab.

a) How does water move in a watershed?

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b) Why are watersheds important?

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c) What are some of the services performed by healthy functioning, intact watersheds?

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d) How do human land use activities impact the movement of water in local watersheds?

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## **PART 2 – How has my Watershed changed over time?**

Becoming an advocate for something means becoming an expert. The BC Tomorrow simulator will help you learn more about your watershed.

1) Go to the dashboard area on the left and choose “Scenarios.”

- Click “*Create a new Scenario*.” Choose the **Historic Scenario**.
- **Find your watershed.** You can click all the way down to your sub watershed. In more remote areas larger watersheds often show more change.
- Provide a title, click “**Run Scenario**”
  - **Definition:** Watersheds are the sum of the streams that gather from heights of land and flow into a common water basin. Sometimes called catchment basins, watersheds are made up of many sub-basins, or tributary basins.
  - Smaller Watersheds drain into larger watersheds; ultimately all water drains into the ocean. In BC, most watersheds drain to the Pacific Ocean. In the north, watersheds may drain to the Bering Sea via the Yukon River, or the Arctic Ocean, via Great Slave Lake and the Mackenzie River.

a) What watershed do you live within? I live within:

- the \_\_\_\_\_ drainage basin,
- the \_\_\_\_\_ watershed and,
- the \_\_\_\_\_ sub watershed (s)

b) List some of the dominant distinguishing features found in your watershed (natural and human). For example: Parks, Towns, Mountains, Rivers, deltas, cities, desert, grasslands, plateaus, ...

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c) Has my watershed always looked like it does today?

The colors on the map represent landscape/land use as follows:

Landscape Type/ Land use	Color
Agriculture	Orange/Red
Natural Grassland	Yellow
Water	Blue
Wetland	Light Green
Forest	Dark Green
Human Settlement	Purple
Energy	Grey
Alpine and Exposed	White

i. Press the **PLAY** button. Watch the landscape change as the years go by. List the top 3 changes you see occurring on the map:

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ii. Examine relationships while the simulator runs. Some relationships you might see:

- “as human population goes up, water quality goes down,” or
- “as natural landscape goes down, GDP goes up,” or
- “as Timber production goes up, natural landscapes go down”

With the dials on the top right (indicators), complete the following observations:

- when natural landscapes went down \_\_\_\_\_
- when Timber production went up \_\_\_\_\_
- when Agriculture production went up \_\_\_\_\_

iii. Develop three of your own relationships you observe in the simulator:

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**PART 3 – What could our Watershed look like when I get older?**

The Business as Usual is how the landscape **could** look if we keep doing what we’re doing without making changes.

a. Go back to the dashboard; choose “Create a new Scenario”

- Choose the **Business-as-Usual** Scenario.
- Again, find a (your) Watershed and click “Run Scenario”
- Press **PLAY**.



b. Watch the indicators and the landscape/land use changes into the future. Complete the Chart 1

CHART 1: Landscape/Land use Area	2020 (Ha)	2050 (Ha)	Trend (increase/decrease)
Agriculture			
Grassland			
Water			
Wetlands			
Forests			
Urban Area			
Industry			
Alpine			

c. What are the trends predicted for the indicators? Complete chart 2.

CHART 2: Indicator Dials	2020 (%)	2050 (%)	Trend (increase/decrease)
<b>Environmental Indicators</b>			
Natural Landscape			
Grizzly Habitat			
Fish Habitat			
Water Quality			
Biotic Carbon Storage			
Greenhouse Gases			
<b>Socio-Economic Indicators</b>			
Population			
GDP			
Energy			
Timber Production			
Agricultural Production			
Water Consumption			



d. Do you have concerns about the land use and/or indicator trends you observe? If so, what indicator trends would you like to change, so that, when you are older, things might look different?

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**PART 4 - Land Use planning.** Decide how you think your watershed should look and make a plan to achieve your goals.

**IT'S YOUR FUTURE. SEE WHAT YOU CAN DO!**

Land use planning is like a scientific experiment:

- 1) You come up with an idea or plan (hypothesis), then you
- 2) run a test (experiment – gather data). Next you
- 3) evaluate the data (use indicators), and then
- 4) adjust your hypothesis/make changes to your plan/experiment, and finally
- 5) run more tests and repeat the process.

The more tests you run, the more confident you can feel about your hypothesis.

- Create *NEW SCENARIO*. Choose “**LAND USE**” find your watershed/study area. Describe the scenario - hit “**NEXT.**”
- Select **GOALS** - Set Environmental and Socio-Economic indicator goals. Are your goals realistic? Click “**NEXT.**”
- Come up with a plan for your area that you think will achieve your goals. Select **CHANGES**.
  - Here you “select” the land use type and place a pin in a suitable location. Place **pins** where you want things to change.
    - For example, if you want to change the forests, place a *forests pin* in a suitable location and use the slider to allocate the land-use for your study area.
  - Use **logic** when placing pins. For example, human settlement will not have much of an impact on the indicators if you put it in a lake or at the top of a mountain!
  - Select other land-uses; place pins in suitable areas and adjust the sliders.
- *RUN SCENARIO*. See how your ideas worked relative to your goals.
- *EDIT* your scenario. Adjust your plan and re-run your scenario. The more scenarios you run, the more confident you can feel about your hypothesis.

**Conclusions:**

a. Describe your plan. What were you trying to achieve? Were you able to achieve your goals?

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b. Did you have to make changes to your goals or how were you able to make your plan work?

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- c. For First Nations people, the concept of “Interconnectedness” is a core world view. In general, this mindset centers toward a fundamental belief that everything in the universe is connected. This all-encompassing world view embraces the idea that people are tightly connected to their communities, to their ancestors, to future generations, to the lands, and to all of the animals, plants and even inanimate objects that reside on these lands.
- For more information, please see <http://www.llss.sd73.bc.ca/clark/flyfishing/interconnectedness.pdf>

How is BC Tomorrow’s simulator consistent with First Nations Interconnectedness view?

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- d. What differences are there between your plan and the Business as usual scenarios? Provide examples.

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- e. After using BC Tomorrow, describe three things that surprised you or made an impression that you would like to share with others.

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Become an advocate for your watershed.  
Go on a **Quest**.