

***Temperature Rising:  
Climate Change in Southwestern British Columbia***

Group Members: \_\_\_\_\_  
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**Trivia Challenge:** Search the entire poster to find answers for the following: (bonus)

1. What animals are diagrammed as methane producers?  
**Sheep and cattle**
2. How thick was the glacier on top of Vancouver 16 000 years ago?  
**1.5 km**
3. What monster is said to inhabit Okanagan Lake?  
**Ogopogo**

**Did You Know?** Use the pieces of information under this heading (“Did You Know?”) on the poster to answer the following true/false (T or F) questions. If the statement is false, cross out the incorrect word or number value, and write in the correct version. (10)

- \_\_\_ Hydroelectric reservoirs supply ~~50%~~ of B.C.’s electrical needs. **F, 90%**
- \_\_\_ Canada has about ~~4%~~ of the world’s population, but produces 2% of global CO<sub>2</sub> emissions. **F, 0.5% population**
- \_\_\_ The cost of fighting B.C.’s forest fires during the 1998 summer was \$120 million. **T**
- \_\_\_ The ~~1980’s~~ was the warmest decade of the last century. **F, 1990’s**
- \_\_\_ 9000 years ago, average temperatures in southern B.C. were 1 – 2 °C warmer than today. **T**
- \_\_\_ The 1948 Fraser River Flood cost an estimated ~~\$400~~-million. **F, \$200**
- \_\_\_ Mackerel may eat young salmon. **T**
- \_\_\_ On average, each person uses over ~~400~~ L of water at home every day. **F, 300**
- \_\_\_ Motor vehicle exhaust is the source of nearly 30% of the greenhouse gas emissions in the lower Fraser Valley. **T**
- \_\_\_ The atmosphere of Venus is ~~75%~~ CO<sub>2</sub>. **F, 98%**

### **Is Climate Changing?**

1. How does weather differ from climate? (1)  
**Daily vs. extended conditions**
2. How do glaciers behave when climate changes? (1)  
**Expand when cools/shrink when warms**
3. By how much is the global temperature expected to rise above 1980 levels by the year 2100? (1)  
**~ 4.5 - 5°C**
4. Where does the global map indicate the most significant temperature changes will occur? (1)  
**The poles**

### **Climate Has Always Changed:**

1. What kind of biodiversity would you expect to have inhabited the Vancouver area 16 000 years ago? (1)  
**Very little, it was covered with ice!**
2. Examine the global temperature change over 10 000 years. What seems to be the trend toward the year 2100? (1)  
**Warming**
3. When did the Little Ice Age occur? (1) **~1300 until late 1800's**
4. Do you think extrapolating the graph from 1998 shows a probable increase? Why or why not? (1)

### **Why is Climate Changing Now?**

1. Record the following information on incoming solar radiation: (2)
  - 25%** absorbed by atmosphere
  - 25%** reflected by atmosphere
  - 47%** absorbed by Earth's surface
  - 3%** reflected by Earth's surface
2. Summarize the carbon balance diagram. (2)  
**Carbon transfers between the hydrosphere, lithosphere and atmosphere.**
3. What turning point saw additions of CO<sub>2</sub> to the atmosphere overtake removals? (1)  
**Industrial Revolution**

4. Aside from water vapour, what are “the big three” GHGs? (1)
  - a) **CO<sub>2</sub>**
  - b) **CH<sub>4</sub>**
  - c) **N<sub>2</sub>O**
5. What are the causes of the rapid build-up of CO<sub>2</sub> in our atmosphere? (1)  
**Human activities: burning fossil fuels, deforestation, agricultural practices.**
6. Examine the graph on atmospheric CO<sub>2</sub> concentrations.
  - a) How many ppm CO<sub>2</sub> are currently in our atmosphere? (1) **~360 ppm**
  - b) What is the projected concentration for the year 2050? (1) **~480 ppm**

### **The Air We Breathe:**

1. What gets trapped in the Fraser Valley? (.5) **Smog**
2. What will happen to the number of “bad air” days as climate warms? (1)  
**Increase**

### **Coastal Floods and Failing Ships:**

1. Wetter and stormier winters are predicted for coastal B.C. Predict what impact this might have on the skiing industry in B.C. (1)  
**Positive and negative impacts.**
2. Are slopes more or less at risk with wetter winters? Explain. (1)  
**More at risk, due to the reduced stability of the slopes.**

### **Rising Seas:**

1. As climate warms, what will happen to glaciers? (1)  
**Melt → increased seawater**
2. What areas are most vulnerable to rising sea levels? (1)  
**Deltas, tidal marshes, low-lying coastal areas**
3. Answer the “?” regarding restricting development along shorelines. (1)  
**Opinion....restrictions might save property if sea levels rise.**
4. Explain what is meant by “coastal squeeze”. (1)  
**Loss of coastal land, and “squeeze” on developed cities and their dykes.**

### **Salmon in Hot Water:**

1. Why might tuna and mackerel replace salmon stocks in southern B.C.? (1)  
**They live in warmer waters, while salmon are a cooler water fish.**

2. How might a reduction in salmon affect B.C.'s economy? (1)  
**Huge impact!**
3. Create a "human stress-o-meter" to temperature, similar to the one for salmon. (2)
- |                         |              |                         |
|-------------------------|--------------|-------------------------|
| <b>Air temperature:</b> | <b>↑45°C</b> | <b>Extreme stress</b>   |
|                         | <b>↑40°C</b> | <b>Very high stress</b> |
|                         | <b>↑35°C</b> | <b>High stress</b>      |
|                         | <b>↑30°C</b> | <b>Uncomfortable</b>    |
|                         | <b>↑25°C</b> | <b>Comfortable</b>      |
|                         | <b>↑20°C</b> | <b>Comfortable</b>      |

**Low-Water Blues:**

1. What industry will largely be affected by changes in river flow with climate warming?  
(1) **Hydroelectric power generation**
2. How much more water is used in an average home for showers than for baths? (1)  
**19% compared to 2%; ~10 times more**
3. What units are river flows reported in? (.5) **m<sup>3</sup>/s**
4. What date typically sees the Similkameen River's highest flow rate? (1)  
**~May 20**
5. Explain what is meant by "evapotranspiration". (1)  
**Evaporation from plant surfaces/leaves.**
6. As evapotranspiration increases, what happens to the summer water table? (1)  
**Decreases**

**Forests in Transition:**

1. Answer the "?" in the centre of this frame. (1)  
**They will suffer....poor growth, increased fire risks, etc.**
2. Approximately how far is Kamloops from Hope, B.C.? (1) **~100 km**
3. Which of these 2 regions (Kamloops/Hope) do you think will be more affected by climate warming, and why? (1)  
**Kamloops – grassland and scattered pine**  
**Hope - forest**  
**Opinion question....forest**
4. What impact will climate warming have on the B.C. forest industry and economy? (1)  
**Improved growth and yield? Loss due to increased fire?**

**Down on the Farm:**

1. Explain why the impacts of warming will have “mixed blessings” for the interior? (1)  
**Better growing conditions vs. increased drought**
2. How will climate warming affect impacts on crops by pests? (1)  
**It will increase the impact pests have.**
3. If you were a greenhouse owner, how would your expenses shift throughout the year from present day? (1)  
**Lowered winter heating costs; increased summer cooling costs.**
4. What do you think the overall impact will be to the average B.C. farmer's income? (1)  
**Opinion...increased yields vs. impacts of drought**

**How Do We Measure Up?**

1. Rank the following regions by their per capita CO<sub>2</sub> emissions: (2)

Canada	<b>2</b>	Latin America	<b>6</b>	India	<b>9</b>
U.S.S.R.	<b>4</b>	China	<b>7</b>	Africa	<b>8</b>
Japan	<b>5</b>	Australia	<b>3</b>	U.S.	<b>1</b>
2. Approximately how many citizens of India have the same impact as one Canadian in CO<sub>2</sub> emissions? (1) **India ~0.25 tonnes/year**  
**Canada ~4.75 tonnes/year → ~19**
3. Out of individual household CO<sub>2</sub> emissions, what % does automobile use put out? (1) **45%**
4. What activities contribute to 75% of CO<sub>2</sub> emissions that are not individually produced? (1)  
**Transportation, electricity generation, fossil fuel production, agriculture, community and industrial waste, other industry.**

**Let's Meet the Challenge:**

1. What did Margaret Mead say? (1)  
**“Never doubt that a small group of committed peoples can change the world. Indeed, it is the only thing that has.”**
2. What does she mean? (1)  
**Open...a small number of individuals in developed countries (on a global ratio) have impacted our world enormously.**
3. Generate a list from group members, outlining what we as individuals can do to help reduce our personal impact on climate change: (1)