



## Climate Insights 101 Questions and Discussion Points Module 1, Lesson 2: Mother Nature's Influence

Available at <http://pics.uvic.ca/education/climate-insights-101>

### 1. Glacial Research and Climate

#### Questions:

Which two countries initially cooperated in the Antarctic ice cap project? (Ref. slide 5)

Why are ice core samples perfect substances for climatologists to study in order to illuminate climate's past? Discuss their importance for determining climate's history. (Ref. slide 6)

Why are ice cores called "Mother Nature's history books"? (Ref. slide 6)

What are two key properties that can be measured in ice and what does the past tell us about the present? (Ref. slide 6)

How long ago was the maximum of the last ice age? What have scientists concluded about the frequency of warm conditions? (Ref. slide 7)

How have scientists been able to deduce that for a long time climate was relatively stable? (Ref. slide 7)

What do scientists find recorded by components of sediment cores and what do they learn from them? (Ref. slide 7)

What was the book that tried to explain why there had been multiple ice ages and when was it written? (Ref. slide 8)

What is the correlation between temperature changes through time at Vostok Station and variations in sunlight received by the northern hemisphere? (Ref. slide 8)

What is the other important information that glacial ice yields? (Ref. slide 7)

Scientists consider results from ice cores drilled at Vostok a proxy for "global-scale glacial-interglacial cycles". What does this mean? (Ref. slide 9)

### **For Discussion:**

Find out more about what motivated the Russians and the French to begin doing research in the Antarctic. Find out what Canada's scientists are doing there now and discuss. (Ref. slide 5)

If this kind of cross-cultural scientific collaboration is possible, discuss what prevents countries from signing on to climate treaties and accords such as Kyoto? (Ref. slide 5)

Analyzing ancient snow at Vostok is very specialized research that not many of us know about. Discuss ways in which we might get this important and fascinating information out to the public in an effective way? (Ref. slide 6)

Vostok holds the record for the coldest temperature on earth (-89.2 C). Which two places would rank second and third in the coldest temperature records? (Ref. slide 5)

If Mother Nature has caused dramatic and cyclical changes in Earth's climate for hundreds of thousands of years, why can't we say she is solely responsible for the changes in climate that scientists have recorded in the past 30 years? Discuss. (Ref. slide 3)

## **2. The Milankovitch Cycle, Volcanoes and Aerosols**

### **Questions:**

What was James Croll's thesis in the book he wrote in the 19<sup>th</sup> century? (Ref. slide 8)

How did Milutin Milankovitch pick up where Croll left off in attempting to explain the origin – and frequency – of ice ages on Earth? (Ref. slide 8)

What correlation reinforces the idea that changes in the Earth's orbit around the Sun act as a "pacemaker" for global climate changes over long time periods? (Ref. slide 9)

What important discovery have scientists made about the Earth's atmosphere by analyzing air samples trapped in glacial ice? (Ref. slide 10)

"Aerosols" is a word we might first associate with spray-cans in the home. What is the other meaning of the word "aerosol", especially as it relates to volcanic eruptions? (Ref. slides 14 and 15)

When we think of volcanoes we probably first think of heat – boiling hot lava – rather than cold. What was the name of the most recent major volcanic eruption to have a cooling effect and what kind of aerosols did it eject into the atmosphere? (Ref. slides 14 and 15)

Scientists estimate that human activities are now adding CO<sub>2</sub> to the atmosphere at a rate that is how much faster than ever before? (Ref. slide 12)

**For Discussion:**

Mt. St. Helens in Washington State erupted in 1980, killing 57 people and covering a wide area with ash. It was the deadliest and most economically destructive volcanic eruption in U.S. history. But while it caused widespread damage, it didn't have any particular effect on the climate. Discuss why. (Ref. slide 15)

**3. El Niño, La Niña and Sunspots**

**Questions:**

El Niño and La Niña affect what parts of the ocean in particular – and how? (Ref. slide 16)

When in the previous century did El Niño profoundly affect the climate – and in what way? And when in this century did the overall global average temperature decline – largely because of La Niña? (Ref. slide 16)

What happens to the Sun that some people say is responsible for temperature trends? (Ref. slide 22)

What are sunspots? How long have we known about the sunspot cycle? (Ref. slide 24)

What's been happening to the Sun's output over the last 30 years as the Earth has warmed? (Ref. slide 24)

Take the following words and turn them into a scientifically correct sentence about what we now know about climate change: human activities, CO<sub>2</sub>, rate, concentration. (Ref. slide 27)

**For Discussion:**

Find out when El Niño and La Niña were identified, who named them, and why. Discuss. (Ref. slide 16)

What is the bottom line about Mother Nature's influence on climate and human activities? Discuss why some people still insist climate change is all Mother Nature's doing – despite hard evidence to the contrary. (Ref. slide 3)