Pacific Institute
for Climate Solutions
Knowledge. Insight. Action.

Climate Insights 101 Questions and Discussion Points
Module 1, Lesson 1: CO_2 and the Greenhouse Effect

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

1. CO_2 and the Greenhouse Effect

Questions:

How did the term "greenhouse effect" originate? Why did it stick in the public imagination? Why is it technically inaccurate? (Ref. slide 1)

Why is the greenhouse effect global in its impact? (Ref. slide 1)

Why does carbon dioxide (CO_2) have such a big influence on the Earth's climate? (Ref. slide 3)

What are the main sources of CO_2 emissions to the atmosphere? (Ref. slide 3)

How are greenhouse gases driving global warming? (Ref. slide 3)

For Discussion:

Jean-Baptiste Fournier, John Tyndall and Svante Arrhenius are names you likely didn't know before taking this course. What were their contributions to the study of climate and why are their individual contributions considered breakthroughs for their time? (Ref. slides 7 and 8)

"Balance" is a key word when assessing climate change and our role in influencing change – one way or the other. The industrial revolution and the on-going industrialization of the world have tipped the balance of CO_2 in the atmosphere. Discuss some ways that both industry and individuals can help redress the balance. (Ref. slides 4 and 5)

China is a rapidly industrializing country. Discuss what you know about how China is addressing the impact of its industrialization on the world as this relates to climate change?

What other countries are also rapidly industrializing?

2. Measuring CO_2 and Evidence of its Impact

Questions:

What has been the warmest decade so far in recorded human history? How has this happened? (Ref. slide 2)

Why was it necessary to find a remote, high altitude site for Dr. Keeling to measure CO_2 concentrations accurately in the atmosphere? If the site were at sea level, what might skew the findings? (Ref. slide 4)

What is a chemical fingerprint? (Ref. slide 4)

What are the four primary sources of human activities that add significant amounts of CO_2 to the atmosphere? (Ref. slide 5)

For Discussion:

What are some of the things we could change in the way we live and work to help decrease the amount of CO_2 we emit into the atmosphere? What would we, as individuals, be willing to give up, to help this process? Discuss. (Ref. slide 5)

Making changes usually means someone pays, in some way. Is this true of global warming? How do we as individuals pay now? And how does industry pay? What or who should take most of the financial responsibility? Discuss.

3. Water Vapour and Methane

Questions:

Name the other principal greenhouse gases. Why is water vapour so important and why is it known as an “amplifier”? (Ref. slide 10)

What is the connection between global warming and increased levels of water vapour? (Ref. slide 10)

How is methane gas used now in Canada and what are the most common sources for this type of gas? (Ref. slide 13)

For Discussion:

Increased methane in the atmosphere has resulted in part from more livestock being raised for meat and more rice paddies being cultivated around the world. Which parts of the world have changed the most in terms of conversion of land use – to raising either cattle or rice? (Ref. slide 13)

As more people become better off and enter the middle class, their diets often change. Why do you think this is and where in the world has this change been noticed the most? (Ref. slide 13)

Beef and other meats have long been a major part of many Canadian diets. Is it justified then for us to encourage other cultures not to eat beef so that the demand for beef decreases? Discuss.

What might be one solution to the problem of increased methane? Could the methane be trapped and used in other ways? Discuss how methane gas is used already in different parts of the world. (Ref. slide 13)

Canadians have used nitrogen fertilizer for a long time to grow crops. Discuss viable substitutes for this fertilizer and how their use could be encouraged? (Ref. slide 14)

4. CFCs and CO_2

Questions:

What is the relationship between the global carbon cycle and the ocean? (Ref. slide 17)

We have known about the harm done by aerosol cans for decades now and generally people have responded by using alternative products. Name some products that still use chlorofluorocarbons (CFCs) and why that is so. (Ref. slide 12)

It is difficult to imagine amounts like 33 and 800 billion tonnes – especially with something invisible, like CO_2, a gas. How does the example of the bath and tap water left running illustrate Mother Nature's balance? Which "taps" have we now opened up since the industrial revolution? Discuss. (Ref. slide 18)

For Discussion:

Which is more of a problem for global warming – population growth or industrial growth? Or is it a matter of <u>how</u> industry operates and grows? Discuss. (Ref. slide 15)

What about over-consumption and consumerism by wealthy countries and the attendant buildup of garbage? What part does garbage play – or does it play any – in global warming? Discuss. (Ref. slides 17 and 18)

We have all appreciated air-conditioned buildings on hot summer days, especially while traveling. What are some other ways to air condition buildings, especially in large hotels and office towers? Would we be prepared to give up air-conditioned hotels while visiting tropical places? Discuss the pros and cons of air conditioning methods. (Ref. slide 12)

Discuss how population growth, especially as it is concentrated in cities, affects the output of CO_2 into the atmosphere.

Name three of the world's cities that have grown substantially in the last 30 years. Which ones are also centres of industry?