



Polar bear near Churchill, Manitoba. PHOTO: C-Jae Breiter

Summary

Earth's climate is changing, and we are seeing shifts in seasonal patterns and consequences for local ecology. For example, in some areas insects are emerging earlier with warming springtime temperatures, potentially before their nectar food sources are available. Greenhouse gas emissions produced by human activities are the primary driver of rapidly accelerating **climate change**. Under normal conditions, a layer of **greenhouse gases** within the Earth's atmosphere helps to trap some of the heat produced by the sun while allowing some to escape into space. As human activity adds more greenhouse gases to the atmosphere, this layer becomes thicker and thicker, trapping increasing amounts of heat. The effects of climate change go beyond rising temperatures; they include extreme weather events, shifting wildlife and vegetation patterns, and rising sea levels.

Arctic environments are changing faster than any other ecosystem in the face of climate change. Snow and sea ice reflect more solar radiation than land or water; this reflectiveness is important for reducing the amount of heat being absorbed by Earth's surface. As sea ice melts, darker ocean surface is exposed, which has greater heat-absorbing potential. This becomes a positive feedback cycle of increasing ocean temperatures further accelerating sea ice thinning and loss, which in turn exposes more ocean surface. We can all make changes in our everyday lives which have far reaching effects in reducing global greenhouse gas emissions.



KEY TERMS

- **Climate Change** - A change in regional and global temperature and long-term shift in weather patterns.
- **Greenhouse Gases** - A gas that contributes to the greenhouse effect by absorbing infrared radiation, such as carbon dioxide and methane.
- **Greenhouse Effect** - The process where gases within the Earth's atmosphere trap heat from the sun which would otherwise escape into space.
- **Carbon Sinks** - A natural or artificial reservoir which accumulates and stores more carbon than it releases - for example, forests and the ocean.



DISCUSSION QUESTIONS

1. **What are ways you could explain climate change to a younger person? A friend? An adult?**
2. **What can you or your classroom do to help combat climate change?**
3. **How has climate change begun to affect your community?**



SUGGESTED RESEARCH PROJECT

How do humans and animals use sea ice? Hudson Bay currently has seasonal cycles of being completely ice-covered and ice-free. During the last few decades, Hudson Bay has typically been ice-free from July/August until November/December. Explore how lives and livelihoods may change if the ice-free season around Hudson Bay was two months longer. What if it was year-round?





Willow ptarmigan



Polar bear



ACTION STEP

Calculate your own carbon footprint, find your biggest source of emissions, and make a change within your own life to reduce your personal greenhouse gas emissions - for example, biking instead of driving..



ADDITIONAL RESOURCES

[Prairie Climate Centre | From Risk to Resilience](#) - Online resource sharing climate science research and educational material

[NASA | Climate Change Time Machine](#) - Visualizations of climate change indicators through time

[Ocean Wise | Seeforestation](#) - Restoring seaweed forests

[Global Footprint Network | Carbon Footprint Calculator](#) - A resource for calculating your individual and household carbon footprint