

Name: _____ Period: ____ Date: _____

Environmental Science
#9-1: The Hole in the Ozone Layer

I. *Please answer the following questions about **stratospheric ozone depletion**:*

1. The ozone layer protects us from ultraviolet (UV) radiation.
 - a. What does UV radiation do to living things? How do you think the ozone layer allowed life to evolve on our planet?
 - b. How is the ozone layer in the stratosphere different from ozone found in the troposphere?
2. The emission of chlorofluorocarbons (CFCs) is the primary cause of the destruction of ozone in the stratosphere.
 - a. What are two ways that we've used CFCs in the past?
 - b. What international agreement phased out the use of CFCs around the world? When did this agreement go into effect, and how many countries have signed on to it?
3. There are several different types of skin cancer.
 - a. What are the three main types of skin cancer? Which of these types of cancer is caused by UV radiation? Which type of skin cancer is the most dangerous, and why?
 - b. On average, how many people in the United States develop skin cancer each year, and how many of them die from it?
4. Cataracts can form in the lens of the eye and make it difficult to see.
 - a. What can be done to treat cataracts after they've developed?
 - b. What can people do to protect themselves from developing cataracts in the first place?
5. One way that humans can protect themselves from developing skin cancer due to UV radiation is to use sunscreen.
 - a. What active ingredient(s) are in sunscreen? What ingredients should we avoid?

- b. Besides sunscreen, what are two other ways that people can protect themselves from UV radiation?

II. *Please answer the following questions about **reducing ozone depletion**:*

- 6. Replacing CFCs with hydrofluorocarbons (HFCs) hasn't been an easy transition. It turns out that HFCs are strong greenhouse gases that are thousands of times more potent than carbon dioxide (CO₂).
 - a. If we can't use CFCs because they deplete the ozone layer, and we can't use HFCs because they accelerate global warming, what's one proposed replacement for these chemicals? Why is this replacement chemical considered to be better?
- 7. It's important that every country around the world agrees to reduce its use of ozone-depleting chemicals, or else the ozone layer will be in danger again.
 - a. Why do you think international agreements are so difficult to achieve?
 - b. What do you think might happen if one country breaks its promise and starts using CFCs again? Why do you think this would happen?
 - c. What mechanisms do you think other countries might use to stop a country from dropping out of an international agreement? How effective do you think this would be, and why?
- 8. As mentioned above, international agreements can be very difficult and can take years or even decades to accomplish. Despite this, there have been many international agreements that have been accomplished over the years. Research an international agreement besides the one about the hole in the ozone layer that has been achieved in the last 100 years.
 - a. Which international agreement did you select, and why?
 - b. Why was this agreement necessary? In other words, what was so important that humans needed to get nearly every country to agree to work together?
 - c. What is the current status of this agreement? Is it still in place, or has it lapsed?
 - d. In your opinion, was this agreement successful? Why or why not?