

## Midterm

I. Fill in the blank (10 points).

1. Most of the energy from the Sun is in the \_\_\_\_\_ part of the energy spectrum.
2. The region of the atmosphere in which the ozone layer is located is called the \_\_\_\_\_.
3. The hypothesis that dinosaurs were killed by an asteroid impact is supported by the presence of a chemical element called \_\_\_\_\_ in the sediment layers at the time of the extinctions.
- 4-5. The two most common components of the atmosphere are \_\_\_\_\_ and \_\_\_\_\_.

II. Short answer (15 points each). Answer these questions with a brief and carefully constructed paragraph. You may find it helpful to draw a diagram.

1. What makes isolated species (such as those on islands) particularly vulnerable to extinction after the arrival of new species?

2. In what ways do the climates of Venus and Mars, are nearest neighbors in the solar system, differ from that of Earth?

3. If warming temperatures on Earth were to lead to increased evaporation and heavy cloud cover, what sort of feedback loop would you expect to see?

4. Air tends to rise at the equator and subside around 30° latitude. Draw a schematic of the circulation. How does the Earth's rotation influence this process?

III. Essay (30 points).

California Senator Barbara Boxer recently sent out the following letter about some electric power plants planned for Mexicali, 3 miles from the U.S. border.

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Dear Friend:

For the past 30 years, a battle has been fought in California to clean up our air. It is a battle that, little by little, we are winning. Our air is cleaner and healthier today than it has been in decades. Even the Los Angeles basin has made remarkable progress and may soon meet the federal standards for carbon monoxide for the first time in 30 years. But we cannot consider the battle won. Our air still does not meet all Environmental Protection Agency standards for healthy air. ....

One of the reasons for the cleaner air we enjoy today are the limits that were placed on power generating plants, with passage of the Clean Air Act. In some parts of our state, those gains are threatened by power plants that are proposed just across our border with Mexico. These power generating plants, though owned by U.S. companies, are not subject to the Clean Air Act because they are not in the U.S., yet threaten to send pollutant-filled air across our borders.

I have joined Senator Dianne Feinstein and Congressman Duncan Hunter in introducing legislation designed to make these border generating plants operate to meet U.S. clean air standards. Our bill would bar Mexican power plants near our border from using natural gas imported from the United States unless the plants meet strict air pollution standards.

As California grows, we will need more energy. However, we can meet both the demand for new power and continue to make progress cleaning up the air. I can assure you that we will work to pass our bill and oppose pollution power plants on our borders. ....

Sincerely,

Barbara Boxer  
United States Senator

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Write an essay commenting on Senator Boxer's letter. Consider the following issues.

After California's recent energy crisis, you might be surprised that Senators Feinstein and Boxer are trying to impede construction of a power plant. Why are they concerned? What might be the environmental impact of the proposed power plants? What sorts of harmful emissions could they release? In what ways are emissions harmful?

In this class we discussed battery-powered zero emission vehicles, which are recharged by plugging into the power grid. If the only electricity available to recharge a ZEV came from a power plant that did not meet California emissions standards, how might this influence car-purchasing decisions?