

Name: _____ Date: _____ Class period: _____

Student Worksheet

Lesson: Temperature and the Earth's Atmosphere

Directions: After reading the background information on the Windows to the Universe web site, complete data table #1.

Data Table #1	
Atmospheric Layer	Based on the background information, list important characteristics of each layer.
Troposphere	
Stratosphere	
Mesosphere	
Thermosphere	
Ionosphere	
Exosphere	

Directions: Refer to the graph, "The Average Temperature Profile of the Earth's Atmosphere" found on Windows to the Universe, and complete the data tables.

Data Table #2			
Atmospheric Layer	Exists between which altitudes (km)	Thickness (km) (Hint: subtract)	Maximum Temperature (°C)
Troposphere			
Stratosphere			
Mesosphere			
Thermosphere			
Ionosphere			
Exosphere			

Directions: Study and analyze the graph, "The Average Temperature Profile of the Earth's Atmosphere" as you complete Table 3:

Data Table #3	
Atmospheric Layer	Describe what happens to the temperature as altitude increases. Be sure to note specific altitudes where abrupt changes occur and how each layer is heated.
Troposphere	
Stratosphere	
Mesosphere	
Thermosphere	
Ionosphere	
Exosphere	

Analysis Questions:

1. Study the graph, "The Average Temperature Profile of the Earth's Atmosphere". Does information there help you to explain why scientists decided where one layer of atmosphere ended and the next one began? Explain your answer.

2. What important layer exists within the stratosphere? _____
3. What is the importance of this layer within the stratosphere?

4. After reviewing the effects of both “good” and “bad” ozone, how do you think our lives would be different if the “good” ozone were destroyed?

5. What important layer exists within the thermosphere? _____

6. What is the importance of this layer within the thermosphere?

7. After reading the section, “Regions of the Ionosphere”, summarize the differences between the D, E, and F layers. Be sure to pay close attention to which wavelengths of sunlight are absorbed and which wavelengths are reflected.

Ionospheric Layer	Characteristics
F	
E	
D	

8 . If the ionosphere did not exist, what do you think might be some possible consequences to humans? Think about which wavelengths the ionosphere blocks and what would happen if these wavelengths were allowed through the atmosphere to the Earth’s surface.

9 . Read the section, "The Sun's Effect on the Ionosphere". How does an increase in solar activity affect the ionosphere? Why do you think this affect on the ionosphere is observed on the dayside and not the night side of the Earth?

10 .What is photoionization?

Extension Questions:

1. Give a possible explanation as to why the density of the ionosphere is greater at low latitudes (30°S to 30°N) than at high latitudes (polar regions). (HINT: Think about the effect of the Sun on the ionosphere and where on the Earth the most direct rays of sunlight are received.)
2. The density of the atmosphere decreases as altitude increases. Give a possible explanation for this relationship.
3. Give a possible explanation as to why the density of the ionosphere increases during the day or during higher solar activity. (HINT: Think about when the Sun's effect reaches a maximum during the day and what happens during solar flares.)