

## Teacher Survey

**Instructions:** Please complete the following evaluation.

1. Did you make any adjustments to the learning module? If so, what did you change or omit?

2. From your observations, are the students more interested in atmospheric science?

3. What part of the lesson was most effective or interesting to them?

4. What concept did the students have most trouble understanding or applying?

## Student Survey

Please distribute this survey to the students before and after completing the module.

**Instructions:** Circle the answer that best describes your feelings about science.

1. I like science.
  - a. I strongly disagree.
  - b. I disagree.
  - c. I am indifferent or unsure.
  - d. I agree.
  - e. I strongly agree.
  
2. How often do you talk to your *family* about what you do in science class?
  - a. Never
  - b. Rarely (less than once a week)
  - c. Once a week
  - d. A few times a week
  - e. Every day
  
3. How often do you talk to your *friends* about what you do in science class?
  - a. Never
  - b. Rarely (less than once a week)
  - c. Once a week
  - d. A few times a week
  - e. Every day
  
4. I think science will be useful when I am older.
  - a. I strongly disagree.
  - b. I disagree.
  - c. I am indifferent or unsure.
  - d. I agree.
  - e. I strongly agree.
  
5. I would like to be a scientist when I am older.
  - a. I strongly disagree.
  - b. I disagree.
  - c. I am indifferent or unsure.
  - d. I agree.
  - e. I strongly agree.

## Effectiveness Assessment

### Part 1: Pre and Post Assessment (Student Evaluation)

**Instructions:** Please distribute and score the **Student Evaluation** for each student before and after completing the module. Each question is worth 1 point.

### Student Evaluation

**Instructions:** After completing the lesson on temperature, please have the students answer the following questions below.

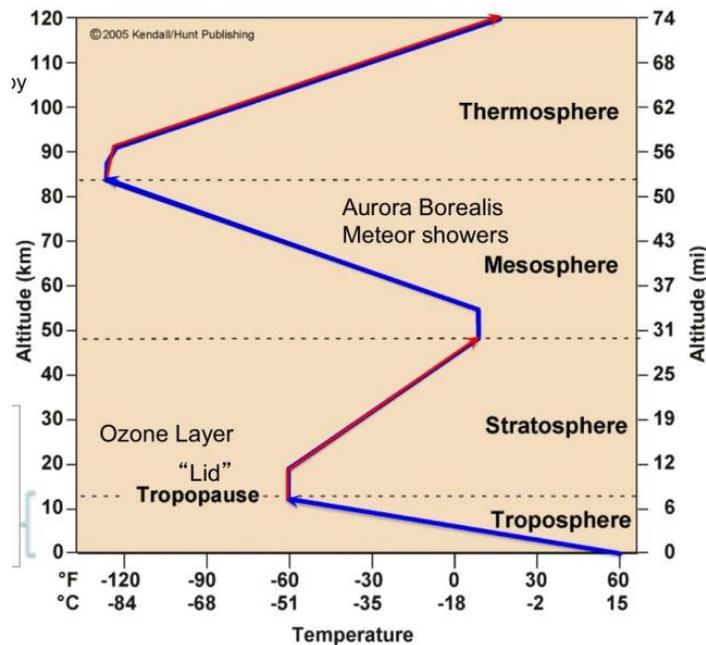
The map below shows the location of three U.S. cities (City A: Portland, OR, City B: Madison, WI, City C: Providence, RI).



1. Which city experiences the warmest summers and coolest winters?
  - a. City A (Portland, OR)
  - b. City B (Madison, WI)
  - c. City C (Providence, RI)

2. As air temperature increases,
  - a. air molecules move faster and expand causing the air to become more dense.
  - b. air molecules move faster and expand causing the air to become less dense.
  - c. air molecules move slower and contract causing the air to become more dense.
  - d. air molecules move slower and contract causing the air to become less dense.
  
3. The sun emits
  - a. rainbows.
  - b. visible light energy.
  - c. thermal infrared energy.
  - d. all wavelengths of radiative energy.
  
4. The earth emits
  - a. conduction.
  - b. visible light energy.
  - c. thermal infrared energy.
  - d. all wavelengths of radiative energy.
  
5. Which instrument measures temperature?
  - a. Barometer
  - b. Sling psychrometer
  - c. Thermometer
  - d. Anemometer
  
6. Which of the following is not a unit of temperature?
  - a. Celsius
  - b. Fahrenheit
  - c. Temps
  - d. Kelvin
  
7. How does latitude effect how temperature varies throughout the year?
  - a. Locations at higher latitudes generally experience warmer temperatures.
  - b. Locations at lower latitudes generally experience colder temperatures.
  - c. The greater the latitude, the greater the yearly variation in temperature.
  - d. The smaller the latitude, the greater the yearly variation in temperature.
  
8. Which is not true about summer in the Northern Hemisphere?
  - a. There is a high sun angle.
  - b. The sun's path through the atmosphere is shortest.
  - c. There are fewer daylight hours.
  - d. The sun's rays are direct on the Tropic of Cancer (23.5°N).

9. Greenhouse gases such as carbon dioxide are vital to life on Earth. Currently, the global average temperature is 59°F. What would happen to the global average temperature if the concentration of carbon dioxide were doubled?
10. The environmental lapse rate is defined as the rate at which the air temperature decreases with altitude. Determine the environmental lapse rate in the troposphere in degrees Celsius per kilometer. (Use the equation and chart below to determine the changes in temperature and altitude from the surface and the top of the troposphere).



$$ELR = - (\Delta T / \Delta A)$$

Change in Temperature (°C) =  $\Delta T = T_{\text{Surface}} - T_{\text{Top}} =$  \_\_\_\_\_

Change in Altitude (km) =  $\Delta A = A_{\text{Surface}} - A_{\text{Top}} =$  \_\_\_\_\_

10. The environmental lapse rate in the troposphere is
- 6 °C/km
  - +6 °C/km
  - 10 °C/km
  - +10 °F/km
  - 3 °C/km
  - 3 °F/km

## Part 2: Math & Science Proficiency (In-Class Activity: Part 3)

Please score **In-Class Activity: Part 3** for each student using the rubric below. This problem is aligned with the following academic standard:

<a href="#"><u>CCSS.MATH.CONTENT.7.NS.A.1.c.d</u></a>
<b>Grade 7: The Number System:</b> Apply properties of operations as strategies to add, subtract, multiply, and divide rational numbers.

### Scoring Rubric

Questions	Score (0 – 3)
Did the student show all of their work?	
Did the student demonstrate knowledge of using order of operations in their calculation?	
Did the student calculate the correct answers?	

*0 – Incomplete*

*1 – Completed with incorrect answer*

*2 – Complete with small errors*

*3 – Complete with correct answer*

### In-Class Activity: Part 3. Calculation

1. The global average temperature is 59°F due to the presence of greenhouse gases in the atmosphere. Calculate the global average temperature in Celsius and Kelvin using the conversions provided below.

Temperature Conversions	$^{\circ}\text{C} = (^{\circ}\text{F} - 32)/1.8$ $\text{K} = ^{\circ}\text{C} + 273.15$
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Temperature ( $^{\circ}\text{C}$ ) =	Temperature (K) =
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